The Narrative Emplotment of Chance Events:

Desire for Control and Tolerance of Ambiguity

in the

Experience of "Meaningful Coincidence"

Steve Hladkyj

A Thesis

Submitted to the Faculty of Graduate Studies

in Partial Fulfilment of the Requirements for the Degree of

Doctor of Philosophy

Department of Psychology

University of Manitoba

Winnipeg, Manitoba, Canada

Canada

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES
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EXPERIENCE OF "MEANINGFUL COINCIDENCE"

BY

STEVE HLADKYJ

A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of

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of

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Abstract

"Desire for control" and "ambiguity tolerance" were hypothesized as two individual difference variables related to the tendency of some people to experience chance events and unusual coincidences as personally significant or to (narratively) "emplot" the events as important to their sense of personal meaning. It was predicted that desire for control (DC) would positively correlate with measures of emplotment and personal meaning (by "projecting order"onto chance), whereas ambiguity tolerance (MSTAT) would negatively correlate with these measures (based on the suggestion that ambiguity poses a "threat" to the clarity of experience). In Phase I of the study, 514 participants completed Burger's (1992) Desirability of Control (DC) scale and McLain's (1993) Multiple Stimulus Types Ambiguity Tolerance scale (MSTAT), along with three measures of emplotment and Reker's (1996) Life Attitude Profile-revised (LAP-R). Narcissism and stress data were collected as potential covariates. The DC hypotheses were mainly confirmed: DC was positively associated with the narrative emplotment of chance and scores on the Personal Meaning Index of the LAP-R. However, contrary to the ambiguity tolerance predictions, MSTAT scores were found to correlate *positively* with the dependent measures, suggesting that tolerance of ambiguity is *conducive* to the creation of personal meaning, rather than being a threat to it. In Phase II, several weeks later, participants completed one or both of two emplotment tasks (writing a personal account of a meaningful coincidence and/or making meaningful matches between personal memories and randomly selected images). Both DC and MSTAT (controlling for narcissism and stress) were positively related to time-on-task, and MSTAT was positively related to the number of matched images. In Phase III, several weeks after the task sessions, emplotment and the LAP-R

were re-measured as a check for task effects. There was some indication that the form of the task may have had small short-term effects on emplotment ratings, but the results were not strong enough to be conclusive. Post-hoc regressions showed that desire for control, narrative emplotment, and transpersonal interpretations of chance (all measured at the start of the study) were significant predictors of scores on the Personal Meaning Index measured 6-8 weeks later.

Acknowledgements

I would like to acknowledge a number of people for their contributions to this thesis. First, I would like to thank my advisor, Dr. Jim Nickels, and my committee members, Dr. Marianne Johnson, Dr. Ed Johnson, and Dr. Riva Bartell, for their support, advice, and feedback throughout the project; their patience and openness; and most importantly, for their demonstrated respect for the ideals of academic freedom. I would also like to thank Dr. Gary T. Reker, of Trent University, for acting as the external examiner of the thesis, and Dr. Michael Thomas (University of Manitoba), who provided valuable suggestions following the original thesis proposal. I would also like to thank five others for their informal contributions to the thesis: Cher Keachie, for the many hours she freely gave in helping me to code the participants' stories; Sarah Pelletier-Gutta (Lakehead University), for the friendly discussions and feedback she continually provided on the subject matter of the thesis; Patricia Barlow (University of New Mexico) for her challenging questions; Dr. Jeannine Turner (Southwest Educational Development Lab, Austin, Texas), whose enthusiasm for the concept of "emplotment" lifted my spirits more than she will ever know; and Dr. Jamie-Lynn Magnusson (OISE/University of Toronto) for encouraging me to apply to graduate school I was an undergraduate. I would also like to especially thank Dr. Ray Perry and Dr. Judy Chipperfield of the University of Manitoba. Their friendship and confidence in me, their guidance in practical matters, and their ongoing concern and tangible support for my development as a researcher is something I can never repay. Finally, I would like to thank my cats for occasionally reminding me, in their cat-like ways (e.g., walking on my keyboard, shredding statistical output, etc.), to try to see my efforts from a broader perspective.

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A casual review of the research literature in any area of psychology will often

reveal, close to the beginning of the article, a statement such as "in recent years,

researchers have become increasingly interested in...," followed by a brief description of

the psychological construct the researcher is concerned with or fascinated by. Almost

inevitably, this statement is soon followed by a brief history of the research on the concept

in question, which in turn, leads to the equally inevitable characterization of the present

state of affairs in the research area. This characterization is frequently cast in terms of the

deficiencies and/or the errors of past thinking, and thus leads to a statement of the self-

evident "need" either to "correct" this past thinking or to answer the "unanswered"

questions, and thus can be seen as constituting the implicit historical justification for doing

more research. Although the above impression might be viewed as a kind of caricature of

scientific writing in psychology, it is intended rather as a way of introducing a point that I

think is important with respect to the subject matter of this thesis. In the broadest terms,

the general "form" of empirical psychological writing that I have presented points toward

the ideas that, first, the recognized identity of any psychological construct, X, rests upon

the logical coherence of its history, and second, that the history of X constrains or directs

the further development of its identity. In this way, the apparently orderly succession and

evolution of ideas in psychology both reflects and supports the philosophical determinism

out of which scientific psychology arose.[1]

One effect of the match between a deterministic philosophy and a deterministic form is that it creates the impression that both the history and anticipated future of psychological discovery were and are under the collective intentional control of those doing the research. Yet, as several writers have pointed out, the progress of science as a whole is not as orderly, determined, or as under the control of researchers as it might appear to be. Kuhn (1962), for example, noted that "an apparently arbitrary element, compounded of personal and historical accident, is always a formative ingredient of the beliefs espoused by a given scientific community at any given time" (p. 4), parallelling the earlier observation made by Peirce (1923/1968) that "of the fifty or hundred systems of philosophy...perhaps the larger number have been, not so much results of historical evolution, as happy thoughts which have accidentally occurred to their authors" (p. 157). More recently, Roberts (1989) provided an exhaustive and good-spirited account of the role of chance events, accidents, and unpredictable situational contingencies in the history of the natural sciences. Similarly, Becker (1994) concluded that although determinism may be formally correct as a model for scientific explanation in the social sciences, the role of chance and accident in the intellectual lives of its practitioners reduces it to an "an empty formalism" (p. 187).

I strongly suspect, for reasons based upon both my own experience and informal conversations with others concerning their experiences, that the reality of psychological

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[1]

See Bazerman (1987) for an interesting historical account of the evolution of APA format out of the Behaviourist paradigm and the way in which it implicitly directs psychological thinking and research.

research, "in the trenches," so to speak, is often as much a head-on engagement with

chance and fortuity (either to minimize their effects or to take unplanned advantage of

them[2]) as it is an ordered intended process in which one moves with cool deliberation from

a confident hypothesis to its inevitable confirmation. Yet, as far as has been my

experience in reading published research, the consequences of chance and accident are all

but obliterated from the narratives of psychological discovery, possibly cloaked (we can

never know for sure) in the language of post-hoc intention.[3] None of this, however, is

meant to suggest that there is some kind of deliberate "conspiracy of silence" in organized

psychology to hide the action and consequences of chance or accident in the research

enterprise, or that the exclusion of these from the scientific narrative reflects an

unconscious self-protective denial in response to epistemological uncertainty, as has been

alluded to by Krantz (1998). Rather, it is to point out, from the perspective that I will be

using in this thesis, that in part, psychological science must, in a manner of speaking,

"fictionalize" its own history in order to understand its own broader identity. This is not

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2

Failing to confirm one's hypothesis "off the mark," although initially disheartening, is often the entry point into the exploration of ideas and data, which, in my own experience has almost always led to more interesting findings and formulations than would have been obtained had things gone according to my original intention. Further, I can think of very few of my peers who have not had this experience; and I sometimes think that if I ever "confirmed the original hypothesis" without the need of additional analyses or further conceptual elaboration, I would start to seriously wonder where I went wrong!

3

I can only confess to my own "sins" on this point. For example, I once accidentally administered a questionnaire twice to a small number of participants in a larger sample, and subsequently came to think of this as a "test-retest" component of the research, as if to fool myself into thinking I had planned it all along. Although in this particular case, there was no intention to publish, I wonder, were I to "write it up" for publication, if I would mention this circumstance of error, or, rather, would I simply edit out the context of discovery and note that "on the basis of a subsample extracted from the larger sample, test-retest reliability was found to be...." Although I can only speak for myself, the simple fact that I can conceive of it leads me to wonder how frequently similar events happen to others and how often they are masked by the conventions of scientific expression.

that much different, I believe, from the way that we each in some ways fictionalize our own lives in order to construct our own self-identities. For example, if I currently think of myself as a civilized being, I will, to convince myself of this self-conception, selectively recall instances in my past which confirm my civility and fail to select instances in which my behaviour was not so civilized. In other words, by "editing out" certain factual segments of my history I create a fictionalized account of my identity. However, to say that a fictionalized account of a life is not a true account, would, I think, be wrong, for no other reason than if we were to have every, single, discernable, unjudged fact of a person's life at hand, all that we would really have would be an ocean of incomprehensibility, which, to my understanding of what "truth" is, is not one of its preconditions. Almost ironically, the construction of a comprehensible truth requires the elimination of facts -- a paring down, so to speak, to those facts which maximize the coherence and logical continuity of a process, whether that process is one related to the historical understanding of an individual life or to the historical understanding of a scientific idea.

The notion that the after-the-fact selection, ordering, and construction of events are necessary for their comprehensibility (which I have referred to as a kind of "fictionalization") brings me to the central concern upon which this thesis is based: Just as chance and accident more than occasionally alter the course of scientific progress, leading to new insights, meanings, and directions, so too do they often alter the course of human lives. However, this is where the parallelism between processes in science and processes in an individual life may end.

The creation of coherence and meaning in science does not ordinarily or formally allow or invite chance, accident, or serendipity to play an _active_ catalytic role in the

process of discovery,[4] and typically accounts for them only, it seems, in historical reflection. In science, chance is generally regarded not so much as an "active" acausal force in the universe in its own right, but rather, the term chance is used as a kind of shorthand designation for the sources of causal effects that are either unmeasured, poorly measured, or simply unknown. For example, in experimental studies in the social sciences, the random (i.e., "chance") assignment of subjects-to-conditions theoretically neutralizes or removes the causal effects of unmeasured variables on the measured variables by, presumably, distributing their effects equally across all conditions; and when we casually say, after failing to find statistical significance, that our effects are "due to chance," we do not mean this literally. Rather, we mean that the results are due to something other than to what we assumed they would be due.[5]

On the other hand, the "rules," so to speak, governing the discovery of personal meaning in a human life do give a "space" in which the unpredictable actions of chance, coincidence, accident, and fortuity may play a pivotal role[6] and even be welcomed or

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4

One exception to this is the role of chance in the drama of statistically-based understanding, in which chance plays the role of the dark villain who must be vanquished so that truth may be glimpsed; a moment that Friedman (1984), following Heidegger, refers to as the "moment of statistical revelation" which, according to Friedman, constitutes the "pre-visioned aim" of all technology-based science.

5

The "something other" is, without further reflection by the researcher, unknown: "Third variables," improper experimental design, poor randomization, flaws in procedures, hypothesis-wise participants, and the like; in short, effects, no matter what they are, or whether they are significant or not, are *caused by something, and never caused by chance*, because chance is acausal and so cannot cause anything.

6

In "single-n" discovery processes, several clinical psychologists (e.g., Hopcke, 1990; Keutzer, 1984; Roehlke, 1988) have noted how chance events and coincidences in the counselling setting have been critically important in furthering the progress of treatment. The most dramatic account of the clinical utility of coincidence has been described by Jung (1952/1969) and was central to his formulations of the concept of "synchronicity."

actively sought out by individuals.[7] However, by definition, chance events are random,

and therefore, *all other things being equal*, should occur with more or less similar

frequency in the lives of everyone, yet people perceive that they do not: Some people, for

example, consider themselves or others as "unlucky" or "accident prone," whereas others

may consider themselves or others as "blessed" or "protected" by the hand of God, fate,

or destiny,[8] while others may not ever even think about it at all. Clearly, "all other things"

in the perception of chance in human lives are *not* equal -- and thus one possibly useful

question for human science becomes that of identifying the psychological sources (and

consequences) of this inequality in the perception and construal of chance. As I hope to

demonstrate in this thesis, one way[9] that the dynamics and functions of chance and

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[7]

Common expressions such as "leaving things to chance," "playing it by ear,"or "going with the flow," all suggest that people recognize that "giving up control" is a viable strategy in certain situations. In this regard, one of the most interesting vacations I ever took was determined by spinning a pencil on a map to determine which direction I would drive in each day.

[8]

In a recent factor analytic study, Hladkyj and Johnson (1998, unpublished data) found that transpersonal interpretations formed the single largest factor, accounting for over 30% of the total response variability (more than 4 times that of any subsequent factors) in a 70-item questionnaire measuring different aspects of university students' experiences of chance events and coincidences.

[9]

The perspective used to consider chance and coincidence in this thesis is not the only perspective that could be used. Other perspectives, for example, might, from one end of the spectrum, proceed from an "error in statistical reasoning" paradigm (e.g., Kahneman & Tversky, 1972, 1973) in which attributions to anything other than just chance are implicitly pathologized as defects in thinking. At the other end of the spectrum, a "quantum mechanics / chaos theory" paradigm could be used as the starting point (e.g, Mansfield, 1995; Peat, 1991). Whereas the former might be thought of as a "downward reduction" that can unnecessarily demean the ego's experience of chance, the latter can be thought of as an "upward reduction" which may unnecessarily inflate it. In either case, neither mathematical reasoning nor microphysics models of the conscious human experience of acausality are of much direct or pragmatic use in understanding how ordinary human beings (as opposed to either the "mathematically challenged" or "mathematically gifted") create personal meaning out of the flow of daily events. For this reason, I have chosen a middle road, through the observable world, so to speak, where chance and coincidence are still bound to the flesh and blood of lived experience.

coincidence in the creation of personal meaning can be understood is by viewing it through

a combined perspective arising from, on the one hand, the concept of "narrative

emplotment" (e.g., Ricouer, 1992) and, on the other, the concept of "interpretive control"

found in the control motivation literature (e.g., Rothbaum, Weisz, & Snyder, 1982).

The Concept of Narrative Emplotment

Taken and adapted from Ricouer (1992) and others (e.g., Frye, 1957;

Polkinghorne, 1988, 1991), the term "narrative emplotment" is used in this thesis to

broadly designate peoples' tendency to retrospectively configure *unchosen*[10] experiences

into their autobiographical identities in such a way as to effect a synthesis of unchosen

experiences (chance) with chosen experiences (will), and thereby give the former

experiences self-relevant meaning and coherence. A personal example will illustrate: In

high school, my ambition was to be a film maker, and following high school, I obtained a

degree in Film and Photography. However, for lack of real-world work experience, I

could not get a job in the film industry following graduation even though I used all of the

"career strategies" that are prescribed for novices (e.g., sending out resumes, filling out

job applications, etc.). The only job that I was able to get was as a "baby, wedding, and

shopping-mall Santa" photographer, which I considered "temporary" because it did not

"fit" with either my self-image or my ambitions. After about a year sending out resumes

and applications without any success, I began to feel in a sense "doomed" to

photographing babies and newlyweds for the rest of my life, and resigned myself to the

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10

By the term "unchosen," I mean to refer to any event or experience that is perceived by the person to occur independently of his or her will or volition. This would encompass chance events, coincidences, accidents, unpredictable contingencies, and so on.

belief that I would never get a job in the film industry. During this period, I drove a decrepit 1962 Dodge which, one day, caught fire and burnt to a shell due to a rupture in the gas line. As it was important for me to have a car to go from maternity ward to maternity ward, I had to replace it as quickly as possible, and decided, in my "doomed" position, to sell my film camera in order to raise money to buy another car. I placed an ad in the local newspaper, and the following morning received a telephone call from the senior cameraman at a local television station. He was interested in purchasing a "back up" camera, and we arranged that he would come to my home that evening to look at it. As planned, he arrived in the evening, however, instead of showing any interest in the camera, he asked me if I was looking for work. I said "yes," and he asked if I could start immediately. Again, I said "yes," and then asked why? He explained that several hours earlier one of their news cameramen had been shot (not fatally), and that the television station needed an immediate replacement until such time that the injured photographer recovered from the gunshot wound. I started my new job the next day, and never photographed another baby again. The doorway to my ambitions had been opened, not by my education, nor by my effort or persistence or will, but by the timely but improbable convergence of a series of ostensibly negative chance events, all of which, in retrospect, were jointly necessary for the positive outcome.

Although each event in the sequence was "caused" (my car burning *because* of a faulty gas line, the photographer being shot *because* he was in the wrong place at the wrong time, my decision to sell the camera *because* I needed the money), the events were *causally independent of each other*. This point is very important for this thesis.

All events are, we usually believe, caused by something, even if we do not know

what the cause is.[11] Accordingly then, there can be no such thing as an objectively

identified chance event. Rather, there are improbable convergences and intersections of

causally independent events. It in this sense that I will use the term "chance" is this thesis.

However, simply noticing the occurrence of chance events (as improbable

convergences of causally independent events) is, in itself, not enough to give rise to the

experience of meaningfulness. For example, on the morning of the day that I originally

wrote this passage, I went out to buy my weekly groceries. On the way, I noticed a dark

blue pickup truck driving slowly in front of me. As I was in a hurry, I passed the truck,

and continued to the shopping centre. About half an hour later, after purchasing my

groceries, I drove to the exit of the shopping centre parking lot to get onto the main road

and noticed the same blue pickup truck, in front of me again, waiting in the exit to get out

of the parking lot. Rather than being a deeply "meaningful coincidence," my experience

was to simply recognize that the driver of the truck and myself had apparently spent the

equivalent amount of time getting our groceries and seemed to be on the same domestic

schedule. Had I left my house either 10 minutes earlier or 10 minutes later, our paths

would probably not have crossed. In effect, this convergence was experienced by me as a

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[11]

The term "cause" is a "cause" for concern: Several writers have attempted to expand the conventional Newtonian conception of cause. Jung (1952/1969), for example, described "synchronicity" as a "principle of explanation" that might account for the perceptible order sometimes found in presumably causeless but meaningful coincidences; in biology, Sheldrake (1981) presents "morphogenetic fields" to explain spontaneous changes in the behaviour of entire populations of organisms in which ordinary explanations of intraspecies behaviour (e.g., observational learning) cannot be demonstrated; while in parapsychology, Taylor (1998) posits the across-time-and-space resonance of similarly-structured "emotional fields" generating by the human brain as an explanation for extrasensory perception. Although each of these conceptions would reveal conceptual differences that distinguish them from conventional "billiard-ball" models of causation, they all can be considered "causal" to the extent that they each attempt to theoretically account for the bases of phenomena that cannot be easily explained by existing models.

meaningless coincidence.   In order for the quality of "meaningfulness" to arise from the

experience of chance events, a second quality or characteristic seems needed: That the

chance occurrence bears a degree of self-relevance, either symbolic or practical, for the

individual who experiences it. For example, in the account of how I got my job in the

television business, my aim of getting this job was very much related, at that time in my

life, to my need to establish an adult self-identity. However, this desired identity could not

be achieved solely by my effort or my intention: It was only through the improbable

convergence of several aim-relevant chance events that I secured a position, and it was in

through this particular self-relevance that the subjective meaningfulness of the events

arose. On the other hand, the chance occurrence involving the blue pickup truck was of

no self-relevant consequence, and thus, meaningless from an emplotment perspective.

For Ricouer (1992), the relationship between the dialectic of will and chance is

central to the concept of "narrative emplotment." At one pole of the dialectic, Ricouer

describes a "line of concordance" -- as a principle of order (for example, the succession of

related events arising out of will or intention), and at the opposite pole, the "line of

discordance" -- as "reversals of fortune," "chance occurrences" (p. 141), or "accidents"

(p. 147). For Ricouer, emplotment is the outcome of a dialectical process -- a "synthesis

of the heterogeneous"-- which creates an "unstable structure" between the poles of

concordance and discordance that is necessary, and which, through its instability, "allows

the story to advance" (p.142). Because of this "concordant-discordant synthesis," the

chance event, coincidence, or accident, in Ricouer's words, "contributes to the necessity,

retroactive so to speak, of the history of a life....[and] thus chance is transmuted into

fate"[12] (p. 147). In my own case of getting a job, for example, each event in the series was necessary to bring about the outcome, and immediately following the events, the configuration, experienced as a whole, was deeply saturated with subjective feelings of "fate," *as if* the convergence of the events had been orchestrated or directed by some unseen intelligence.

The varied literary-like perspectives associated with the concept of emplotment (which may or may not parallel Ricouer's own conception of emplotment, which he derived from Aristotle) have been increasingly grafted into the human sciences as part of a larger historical development in which "narrative-as-a-whole" has come to be seen (or restored) as central to the understanding of human lives (e.g., Gergen & Gergen, 1983; Hermans, 1992; Mattingly, 1994; McAdams, 1988, 1996; Neimeyer & Stewart, 1996; Polkinghorne, 1988, 1991; Widdershoven, 1994). In tracing and defending this development, Bruner (1990; paraphrasing Heider, 1958), for example, suggests that "since human beings react to one another in terms of their own psychology rather than, so to speak, the psychologist's psychology," social scientists "might do better to study the

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12

This transmutation of "chance into fate" can be easily observed in almost any heroic fiction. The popular commercial film "Die Hard" is a good example: An off-duty New York police officer, whose only intent is to travel to Los Angeles to be with his children for Christmas and to "patch up" a failing marriage (the line of concordance) fails miserably at his first attempt at reconciliation. Shortly following, he encounters a group of terrorists (the line of discordance), and in dispatching them, wins back his spouse. His identity as "a cop" (as opposed, for example, to an identity as "an accountant"), is logically independent of the line of concordance (after all, the aim of marital reconciliation could as easily be the aim of an accountant as the aim of a police officer). It is only through the discordant event (the appearance and encounter with the terrorists) that his identity (as "a cop") becomes relevant to the story, and it is only through the unchosen discordant event that the aim of the concordance (reconciliation) is achieved. Had the terrorists not appeared, he might have flown back to New York alone and his identity as "a cop" would have been irrelevant; had he been an accountant, he would have not known how to deal with the terrorists. In this way, will and contingency are synthesized and made into a narratively meaningful *unity* by the transformation of chance into "fate."

nature and origins of the 'naive' psychology that [gives] meaning to their experience" (pp. 37-38). This "meaning" (whatever it might specifically be for each individual) is, according to Sarbin (1986a), to be found in narrative modes of understanding, for as he argues, long before the science of psychology existed, people made sense of their experience and understood the meaning of their lives through the creation and telling of stories, and further, continue to do so in spite of over a century of scientific psychology.

According to Sarbin, the reason for the historical persistence of narrative as the vehicle for individual meaning is that for people living in the ordinary day-to-day world, narrative forms of understanding (e.g., drama, myth, folklore, legend, autobiography, etc.) have retained their original power to stimulate imagination and action that positivist psychology has lost by "reduc[ing] the drama of humanity to the play of impersonal forces" (1986b, p. 10). Any number of examples could be use to illustrate this point. In the student achievement domain, for example, the motivation to study hard, to get good grades, and so on, arises (I would contend) not so much from the student's self-reflective appreciation or detached and passionless self-regulation of his or her metacognitive processes, but rather gets its impetus from the student's gestalt-like *vision of a possible future* constituted by an imaginary life-story that the student hopes to make real through his or her education. Whereas metacognition may, in a manner of speaking, provide the *methods* of achievement, the student's identity-goal provides the *reason*, and it is through the student's narrative vision of his or her own life that the link between motivation and cognition is made (Marcus & Nurius, 1986). On the other hand, without a narrative vision of a possible life that gives meaning and purpose to the student's current experience, motivation may suffer, even if the student's metacognitive skills (e.g., critical thinking,

self-monitoring of learning, etc.) are more than adequate to the task.[13] This example is not intended to edge sideways into the ongoing debate between cognitivists and motivationalists in educational psychology,[14] but rather, the intended point here is that, from the perspective of the narrativist paradigm, *the individual's self-narrative constitutes the larger organizing frame of human meaning* through which the smaller and cooler "impersonal" and "technical" (i.e., "unemplotted") truths of scientific psychology can be contextually appreciated. In other words, in the example given, although metacognitions may be recognized by the student as being "embodied" to the extent that they are understood as internal, cognitive *processes*, under potential volitional control of the student, this recognition does not in and of itself guarantee that they will be, so to speak, "emplotted" into the repertoire of means through which the student finds or constructs a sense of meaning in his or her experience. This, I maintain, is a synthesizing function of the goals inherent in the student's narrative vision.

Unfortunately, however, from a sampling of the narrativist literature, it appears, *with the exception of Ricouer*, that the role of chance in the narrativist paradigm has fared

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This point is not without theoretical and empirical support. For example, Graham (1991) suggests that even in an undertheorized state, educators are increasingly incorporating autobiographical tasks into curriculum, recognizing, even if intuitively, that learning is enhanced when students relate course content to their own autobiographical experience. From a memory perspective, the self-reference of information has been found to increase later recall (e.g., Rogers, Kuiper, & Kirker, 1977); and from a motivational perspective, Hladkyj, Pelletier, Drewniak, & Perry (1998) found that students who spontaneously engaged in the "emplotment" of their academic experiences finished the year with greater levels of academic motivation than students who did not.

14

Interested readers are referred to Prawat (1998) for a broad overview of this issue in educational psychology.

no better than it has in the determinist paradigm.[15] I cannot definitively answer why this might be the case, although I can offer a speculation: It may be that beneath the veneer of learned and adopted epistemological systems there is a more fundamental and shared basis for the "turning away" from chance by both, which may be found in the concept of "agency." Bakan (1966) maintained that all living forms are motivated by two "fundamental modalities" (p. 14) -- "agency" -- which he described as "self-assertion and self-expansion....the urge to master," -- and its antipode, "communion" -- which he described as the motivation to surrender the individual self into a "union," a "sense of being at one with other organisms," in "noncontractual cooperation" (p. 15). For Bakan, western civilization's overvaluing of individualism, self-determination, efficacy, and so on, together with a suppression and devaluation of the communion motive have resulted in what he calls a pathological "idolatry" of agency in which the "the worship of the means toward fulfilment" becomes as important as the fulfilment itself (p. 6). At the expressive heart of agency, the means toward fulfilment is the exertion of control.[16] If it is the case, as Bakan suggests, that the agentic drive is innate in all forms of life, then, at this fundamental level, there would be reason to think that the cultural overlay of one or

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15

The sheer volume of post-modernist writing on narrative makes a definitive statement on the consensus role of chance within the paradigm effectively impossible for all but the most voracious of readers. I presume, however, that my sampling of the relevant literature is reasonably representative, and that my inference is reasonably accurate. If this is the case, then Ricouer is the only author encountered in which chance is given an *explicitly defined and relatively important primary role* in the creation of human narratives of identity.

16

The exertion of control is manifest in many ways. For Bakan, agency included control over others, control over the natural environment, control over the self through asceticism and the self-regulation implicit in the Protestant work ethic, control over economics via Capitalism, etc. It is difficult to think of any aspects of modern life in which the most fundamental motivation is based on something other than the agentic motive. We are so deeply submerged in the "culture of agency" that it is sometimes difficult to see how things could be otherwise.

another philosophical positions (e.g., determinism, structuralism, post-modernism, or whatever other "-ism" defined by professional thinkers to denote their identities) would do little more than alter the *form* of agentic expression, but, so to speak, leave the *content* the same. I might, for example, hazard an argument that apart from the sociopolitical nuances attached to the term, the contemporary notion of "empowerment" is *fundamentally no different in its originating motive* than that associated with expressions such as the "desire for control" (e.g., Burger, 1990, 1991) or the "will to power" (e.g., Adler, 1955; Nietszche, 1901/1968). Likewise, I would further see no immediate reason why the adherents of one epistemology should be any more or any less prone to the idolatry of agency than another. If these presuppositions can be taken as provisionally reasonable, then it might be possible to understand why formal reflections on the role of chance in human life have been more or less completely "turned away from" by both epistemological camps. Chance is, in a sense, anathema to both scientific and narrativist paradigms, for it limits the ideal of "self-determination" in the older epistemological camp, and the notion of "authorship" in the newer. Although their lexicons may differ, their underlying agentic motives may be the same -- to maximize autonomy and control over the unfolding of life and experience.

Psychological Factors in Narrative Emplotment

I have thus far taken a rather roundabout route in approaching the central question of this thesis. I would now like to take one more step closer toward it by linking the concept of narrative emplotment to two psychological concepts -- the concept of "control" and the concept of "ambiguity tolerance" -- in such a way as to move toward the formulation of empirically testable hypotheses concerning a possible psychological basis

for the emplotment of chance. To do this, I will address the relationship of each of the

concepts to narrative emplotment in two separate, major sections: first, a section linking

emplotment to the concept of control, followed by a second section linking emplotment to

ambiguity tolerance. Each section will conclude with "its own" internal set of hypotheses

that could in principle stand as *relatively* independent of hypotheses made in the other

section. This approach is not intended to "isolate" the perspectives from each other, but

rather is intended as a way of organizing the manuscript in a way that I hope will enable

the reader to follow my own train of thought in the development of this thesis. On this

point, the order of the sections is not arbitrary. Rather, it reflects both the historical order

in which I encountered and thought about the ideas as well as what I perceive as a kind of

"hierarchical" relationship between control and ambiguity tolerance in which control is

more deeply rooted in the archeology of basic motivation, and ambiguity tolerance is more

of a "cognitive" outgrowth. For these reasons, the section linking emplotment to control

is presented first, as a kind of prerequisite for the subsequent section linking emplotment

to ambiguity tolerance.

Narrative emplotment and the concept of control. At the risk of overstating the

case, control, as already suggested, has an omnipresent quality as a fundamental value in

the contemporary world. This omnipresence has been and continues to be reflected in

academic psychology. As an overarching construct, Skinner (1996) notes that there are

more than 100 terms and phrases in the literature which are related, either obviously or

indirectly to the concept of control (e.g., locus of control, self-efficacy, mastery,

autonomy, self-determination, control expectancy, capacity beliefs, motivation for control,

desire for control, action-control, etc.),[17] which she estimates collectively produce an

equally large number of new published articles annually. To bring some systematic clarity

to the confusion that has arisen from the proliferation of control constructs, Skinner

suggests that "the most fundamental distinction in the literature on control is between

actual control...and *perceived* control" (p. 550). It is this latter category of control that

this thesis is concerned with and which has bearing on the issue of the relationship of

chance to emplotment.

Within the *perceived* control literature, however, there is also a proliferation of

conceptual variants. Langer (1975), for example, describes the "illusion of control" as the

beliefs a person may have that he or she can exert control over chance determined

outcomes, for example, by blowing on a pair of dice to roll high numbers, or by believing

that personally selecting lottery ticket numbers (as opposed to having the numbers

assigned by a machine) will exert a desired effect on the consequences. "Locus of

control" (Rotter, 1982) is another widely recognized trait-like variant of perceived

control. In this conception, a person who believes that events are largely contingent upon

effort or ability is said to have an *internal* locus of control, whereas a person who believes

that events are "not...entirely contingent upon his [or her] action...perceived [instead] as a

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For Skinner (1996), the proliferation of control-related concepts has made the synthesis of research findings across different domains very difficult. Further, the use of the same or similar terms to refer to essentially different constructs often leads reviewers to conclude that "findings are inconsistent or even contradictory, when it is in fact the definitions that are inconsistent and contradictory" (p. 550). For Skinner, the confusion arising from the proliferation of terminology and conceptions of control is particularly problematic in health related research, in which both beneficial and detrimental effects of control have been found. Because of this, one legitimate concern for control researchers is that well-meaning practitioners may over-generalize a limited range of research findings and unintentionally misapply them in clinical or counselling contexts (from discussions with R. Perry & J. Chipperfield).

result of luck, chance, fate, as under the control of powerful others, or as unpredictable

because of the great complexity of forces surrounding him [or her]" is by comparison said

to have an *external* locus of control. Self-efficacy (Bandura, 1977, 1982a, 1989) is a third

widely recognized and researched perceived control construct. For Bandura, human

agency and actions are construed as neither completely autonomous (entirely self-

generated) in their origin nor "epiphenomenal by-products of conditioned responses"

(1989, p. 1175; a polarity that parallels the distinction between "internal" and "external"

locus on control). Rather, Bandura conceptualizes self-efficacy as an "emergent

interactive agency" characterized by a "reciprocal causation" in which action, cognition,

affects, along with other personal factors and external environmental events "all operate as

interacting determinants" (p. 1175).[18]

A fourth variant of perceived control that is of special relevance for this thesis is

designated as "interpretive control" by Rothbaum, Weisz, and Snyder (1982).[19] They

describe interpretive control as an active "search for meaning and understanding" (p. 24)

that "sometimes overshadows the striving for primary control" (p. 25). However, rather

than leading to the perception that one "has control" (in the sense of perceiving oneself as

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[18]

Interestingly, Bandura (1982b, 1998) is one of the few major figures in contemporary psychology to recognize and specifically include chance as an important determinant in the life path.

[19]

Rothbaum et al. (1982) describe interpretive control as one of four subcategories of what they refer to collectively as "secondary control." The other three sub-categories of secondary control they describe are "predictive control" – in which people support their sense of control by knowing what to expect in the future; "illusory control," – a sense of control grained through the alignment of the self with the powers of luck or fate; and "vicarious control" – in which perceptions of personal control are heightened through identifications and associations with socially powerful or authoritative others. Choosing the term "secondary control" to distinguish it from more traditional "primary" conceptions of control (i.e., actual or objective influence), the authors maintain that people use both primary and secondary forms together to attain and support their overall global perceptions of control.

the source of direct causal agency over events), the sense of control that arises as the consequence of the reinterpretation of events is more akin to attaining a "goodness of fit" between one's self and one's circumstances or to "flow with the current" of experience (p. 8)[20] and appreciate the order, personal meaning, and potentially positive consequences that emerge from the attainment of this "fit."

The concept of interpretive control, or at least the processes and consequences that are referenced by the term, can be understood as having been foreshadowed and reflected in several psychological paradigms that are not ordinarily regarded as being specifically concerned with issues of "control" per se. One example is Butler's (1963) concept of the "life review." Challenging the then-predominant view of reminiscence in the elderly as the "aimless wandering of the [aging] mind" (p. 66), Butler instead suggested that reminiscence is a functionally important part of a universal "life review" process through which individuals could reinterpret the past, resolve inner conflicts and anxieties, and find "new and significant meanings" in their lives (p. 68).[21] Similarly, Erikson's (1950) description of the developmental stage he called "ego integrity vs. despair" can be viewed from an interpretive control perspective. On ego integrity, he wrote that:

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In this respect, secondary control can be understood as parallelling Bakan's conception of "communion."

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For Butler, the life review process was prompted by the individual's growing awareness of approaching death, and served to prepare the individual for it. In support of this claim, he anecdotally noted that the life review was not restricted to elderly individuals, but also occurred in younger persons with terminal illness and in death condemned prisoners. From an historical perspective, Butler's proposal can be understood as signalling an important shift in psychological thinking about reminiscence and related phenomena -- that is, a shift away from a pathologistic "helplessness" paradigm and toward a health-oriented perspective.

> It is the ego's accrued assurance of its proclivity for order and meaning....an experience which conveys some world order and spiritual sense, no matter how dearly paid for. It is the acceptance of one's one and only life cycle as something that had to be and that, by necessity, permitted of no substitutions....the possessor of integrity....knows that an individual life is the accidental coincidence of but one life cycle with but one segment of history (p. 268).

A third example of interpretive control can be found in Frankl's (1946/1984) reflections on his experiences as a Nazi concentration camp prisoner:

> What was really needed was a fundamental change in our attitude toward life. We had to learn...that it did not really matter what we expected from life, but rather what life expected from us....sometimes the situation in which a man finds himself may require him to shape his own fate by action. At other times it is more advantageous for him to make use of an opportunity for contemplation and to realize his assets in this way. Sometimes man may be required to simply accept his fate, to bear his cross (pp. 98-99).

What all of these examples have in common with respect to the notion of interpretive control is that the sense of order, meaning, fatefulness, and uniqueness of a life, and so on, are the consequences of an active reflective engagement with experience in which all of the fragments of living are reorganized into a coherent unity that has an *aesthetic character more suggestive of the totality of life being experienced-as-a-drama rather than as-a-collection-of-facts.* In this sense, then, the phrase "interpretive control" might as easily be called *narrative control* without any loss of essential meaning, or equivalently, the concept of "interpretive control" may be understood as "emplotment" by a different name.

With respect then to the specific focus of this thesis -- that is, as an intended exploration of the psychological dynamics underlying the emplotment of chance -- it can be understood that the emplotment of chance into the self-narrative (i.e., self-identity) may in part be the consequence of the fundamental motivation to perceive control, not only

through the overt, direct, or "primary" control-of-events, but as well through "secondary" interpretive means where the objective is the *perception of order through the control-of-meaning.* On this point, the analogy to "authorship" becomes particularly relevant. Novels, films, television dramas, and so on, are not typically peppered with chance events which carry no relevance to the plot of the story.[22] Rather, the protagonist finds him or herself at the point of convergence where the impact of one or more causally independent events propels the story forward in such a way that reader or viewer knows, either sooner or later, and very clearly, that the occurrence of the chance event was inevitable and necessary, such as the "fateful" meeting of strangers in a love story, the detective's "accidental" discovery of a crucial clue in a murder mystery, or the hero's "lucky" near-miss encounter with death in an adventure story. Of course, none of the chance events in fictional works actually occurs by chance. Rather, they were chosen and placed there by the author precisely because they conform to the demands of the plot. By selecting the plot in which the outcome is known, the author, in effect, controls chance events and the meanings attached to them. In the "real world," however, the final outcome of a human life is, apart from death, largely unknown because of the unpredictable vicissitudes of experience, and thus the "plot"of a life (which Ricouer sees as coterminous with the identity of the character) must be built and continually re-built out of the ongoing flow of experience. This ongoing flow of experience would of course contain a large number of chance events as well as intended events, and thus the task of "authorship" -- that is, to

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Notable exceptions do exist. One that comes to mind is David Lynch's television series "Twin Peaks" (a detective story so saturated with unusual events that bore no obvious or apparent relationship to the plot -- such as the periodic appearance of a backward-talking dwarf -- that the series took on an eerie surrealistic dream-like quality that many viewers, including myself, found at times to be genuinely disturbing).

"emplot" both chance events and chosen events into a unity of meaning through the

exertion of interpretive control -- falls on the experiencer.   However, just as some people

want to be authors of novels, plays, films, and so on, more than other people, the same

may be said of people living in the day-to-day world: Some may want to be the "authors"

of their own meanings, while others may not care a whit about it. Thus, to the extent that

I have equated emplotment with interpretive control, one likely candidate as an important

individual difference in "predicting" who will emplot chance events as meaningful, fateful,

or synchronistic is the Desire for Control (e.g., Burger & Cooper, 1979).

Characterizing the desire for control as a general motivational factor underlying

much of human behaviour, Burger and Cooper (1979) profiled those having a high desire

for control as being "assertive, decisive, and active....seek[ing] to influence others....[and]

manipulating events to insure desired outcomes," as opposed to those low in the desire for

control, who were characterized as "nonassertive, passive, and indecisive" (p. 383).

Research on the effects of desire for control has shown, for example, that in social

situations people scoring high in the desire for control show resistance to attempts to

change their attitudes through counterattitudinal persuasion (Burger & Vartabedian,

1980), offer less information about themselves, tend to have the last word by ending

conversations, and in some situations attempt to control the content of conversations

through interjections, interruptions, questions, etc. (Burger, 1990). In the academic

domain, high desire for control has been associated with increased levels of attributional

reasoning for the causes of success or failure following a test (Burger & Hemans, 1988);

and in games-of-chance situations in which high control participants were, when given the

option, more likely than low desire for control participants to personally choose their own

lottery numbers as opposed to having the numbers randomly assigned by the lottery ticket machine (Burger, 1991).

Burger and associates have satisfactorily shown that the desire of control, as a general motivational factor, is related to behaviour in situations where objective or "primary" control is either possible or believed to be possible. Can the same be said of "secondary" control situations where the objective is the control of meaning through an interpretive process? That is, would high desire for control individuals be more likely to "emplot" chance events through interpretive control than low desire for control individuals? I suspect so, and this leads to the first formal hypothesis of this thesis, which is comprised of three interrelated sub-hypotheses: First, it is expected that the desire for control (as measured by Burger's [1992] Desirability of Control Scale) will be positively correlated with the extent to which individuals meaningfully interpret (i.e., emplot) past unchosen experiences (as measured by the Narrative Emplotment Scale, Hladkyj, 1998a; described below in the Method section). Second, it is also expected that desire for control will be positively correlated with the extent to which individuals prospectively emplot their future (as measured by the Possible Lives Questionnaire , Hladkyj, 1998b; described below in the Method section). The third sub-hypothesis is that the desire for control will also positively correlate with the extent to which individuals experience and interpret chance events and coincidences as having personal meaning (as measured by the Chance and Coincidence Questionnaire, Hladkyj & Johnson, 1999; described below in the Method section).

The second control-related hypothesis consists of two sub-hypotheses. First, the desire for control will positively correlate with the sense of existential meaning and

purpose (as measured with the Personal Meaning Index of Reker's 1996 Life Attitude Profile); and second, high desire for control individuals will show greater persistence in attempting and succeeding in the creation of self-relevant narrative meaning and order when presented with novel and potentially-meaningful chance-determined stimuli than low desire for control individuals (the exact details of this "emplotment task" are described in the Method section below).

    <u>Narrative emplotment and the concept of ambiguity tolerance</u>. Thus far, a case has been presented in which the emplotment of chance events can be understood as issuing from the human tendency to create self-relevant meaning and a sense of narrative unity out of the raw material of experience. Further, this narrative impulse is motivated by an underlying need to perceive that there is control and order in one's life and that, in the case of chance experiences in which objective or "primary control" over the occurrence of these events is not possible, perceptions of control can nonetheless be achieved by "interpretively controlling" the meaning that the events can have for the experiencer.[23] Finally, this position was qualified by the suggestion that one individual difference variable -- the desire for control -- may motivationally regulate the extent to which the emplotment of chance is pursued or attained. At this point I would like to suggest that a second individual difference variable may be relevant to the emplotment of chance -- the tolerance of ambiguity (e.g., Budner, 1962; MacDonald, 1970; McLain, 1993).

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Although people can gain perceptions of control through other "secondary" means described by Rothbaum, et al. (1982), such as predictive, illusory, or vicarious processes, I have chosen to focus my attention on "interpretive control" because, as the original authors suggested, the former three forms can be nested within the latter. In this way, interpretive control can be thought of as the more broadly encompassing construct of secondary control.

Tolerance of ambiguity has been broadly defined as a trait-like cognitive variable related to the willingness or capacity to accept or feel comfortable with events or information that can have more than one interpretation, or to not feel threatened by ambiguous stimuli or the lack of closure to a question, decision, or concern (Friedland & Keinan, 1991; MacDonald, 1970). Research using the construct has found, for example, that high ambiguity tolerance is related to sex role androgyny (Rotter & O'Connell, 1982), lower levels of occupational role stress (Keenan & McBain, 1979), lower levels of causal explanatory ascriptions under stressful conditions (Friedland & Keinan, 1991), reduced levels of dogmatism (MacDonald, 1970), receptivity to change (McLain, 1993), and lower levels of authoritarianism (Budner, 1962). Of particular relevance for the current study are more recent findings from two streams of research that show that *low* tolerance of ambiguity is related to the increased use of "magical thinking" in stressful circumstances (Keinan, 1994) and to several related studies in which, on the one hand, low tolerance of ambiguity was found to be associated with "fear of the paranormal" (Houran & Lange, 1996, 1997), with some indication that, on the other hand, high ambiguity tolerance was associated with belief in the paranormal (Houran & Williams, 1998).

In the first of these studies, Keinan (1994) administered measures of stress and ambiguity tolerance along with a contextualized measure of magical thinking to samples of Israeli residents in areas that had been subject to Iraqi missile attacks during the Gulf War ("high stress" condition) and to residents living in areas not attacked and believed to be relatively safe from such attacks ("lower stress"). Results showed a significant interaction

between stress and ambiguity tolerance in which the highest levels of magical thinking [24]

were found under conditions of high stress among those having low tolerance of

ambiguity. For high ambiguity-tolerant individuals, magical thinking was reduced, and

more or less equivalent[25] to magical thinking in those with low stress. Keinan interpreted

these results from a control perspective and suggested that under stressful and ambiguous

conditions, such as would be the case in an area subject to unpredictable missile attack,

low ambiguity-tolerant individuals would experience the stress of uncertainty and

unpredictability as a greater threat to personal control relative to high-ambiguity-tolerant

individuals, and thus, in an effort to restore a sense of control, be more likely to employ

whatever means available to them, including magical thinking.[26]

In the second stream of research, Houran and Lange (1996) suggested that the

experience of "paranormal phenomena" (e.g., ghost hauntings, poltergeist events) may in

part be due to the perceiver's affective reaction to ambiguous environmental stimuli, and

on this basis hypothesized that individuals low in tolerance of ambiguity would have

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Magical thinking was operationalized by measuring context-specific superstitious beliefs and behaviours, such as, for example, the ritual destruction of photographs of Saddam Hussein, seeking to associate with and be with lucky survivors of previous missile attacks, or believing that one's chances of survival during an attack would be increased by entering the bomb shelter "right foot first."

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Keinan does not provide specific individual tests of significance of magical thinking differences across levels of stress in high tolerance participants. The claim of equivalence of magical thinking in high tolerance participants is based on a visual inspection of the plot of the means for the interaction, in which it is fairly obvious that any differences in magical thinking (whether significant or not) would likely be regarded as trivial compared to differences among those low in ambiguity tolerance.

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In a mild critique of psychoanalytic explanations of magical thinking as a regression to an infantile state of consciousness, Keinan noted that even though people are fully aware of the irrationality of their magical beliefs and superstitions, they will nonetheless employ them "just to be safe on the safe side."

greater fear of paranormal than those with higher levels of ambiguity tolerance. To test

this hypothesis, they measured ambiguity tolerance and fear of the paranormal[27] in a

sample of university students, and found, as predicted, a significant negative correlation

between the two measures ($r = -.33, p < .001$) that suggested increased fear of the

paranormal in low ambiguity-tolerant students relative to those with high ambiguity

tolerance. Support for the generalizability of these findings was subsequently found in a

replication study using an older non-student sample ($r = -.27, p < .03$; Houran & Lange,

1997). In a third study (Houran & Williams, 1998), a more fine-grained analysis of the

relationship between ambiguity tolerance and specific types of paranormal belief and

experience reproduced the previous findings of the low tolerance - high *fear* of the

paranormal relationship ($r = -.18, p < .05$), but in addition, also revealed a *positive*

correlation between ambiguity tolerance and paranormal *belief* ($r = .19, p < .05$), and

reported paranormal *experience* ($r = .30, p < .05$). The authors suggest that these

equivocal results may point toward a more complex non-linear dynamic that relates

ambiguity tolerance, either high or low, to paranormal experience "so that they appear

comprehensible and thereby able to be mastered, at least intellectually" (Irwin, 1980, as

cited in Houran & Williams, 1998).

Although the results from Keinan (1994) and Houran and associates (1996, 1997,

1998) may at first appear in some sense unrelated because of their differing situational

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Fear of the paranormal was measured using a subscale of the Anomalous Experiences Inventory (AEI; Gallagher, Kumar, & Pekala, 1994). The AEI is a generalized measure of paranormal fear that includes a broad range of items -- such as the fear of visiting a fortune teller, finding paranormal stories frightening, fear of having altered-state experiences, etc. According to Houran, the scale thus measures more than just reactions to specific past experiences, but also is a measure of fear of possible contact with "the unknown, the uncertain" in general (Houran, personal communication, January 14, 2001).

contexts (low ambiguity tolerance and increased use of magical thinking in a war zone, compared to low ambiguity tolerance and increased fear of the paranormal in mainly college students in a relatively safe sociopolitical environment), they can be conceptually linked in several ways. First, considered together, the studies define a range of perceived potential threat from the very tangible and real (e.g., missile attacks) to the very *in*tangible and *un*real (e.g., ghosts, poltergeist hauntings). Second, both invoke cognitions based upon the belief in the existence of an agency or organizing principle in nature that lies outside the realm of what is currently and consensually recognized as possible by science. Third, the focus of both is on events which could be characterized as intrusive, disruptive, and contrary to will and intention.

In the context of the current study, can chance events be similarly construed? From an informational perspective, chance events are ambiguous to the extent that their causal antecedents are unknown or at least imprecisely known. Further, any immediately perceptible meanings or implications they may have for the experiencer, if any, may not be much more than ineffable intimations. In the cited studies, the ambiguous events were threat events placed (by the current author) along a dimension of tangibility (from tangible missile attacks to intangible ghost hauntings). It is not as easy to map chance events directly into this schema, given the (presumed) infinite possible intersections of acausally related events, some of which would be clearly threatening (e.g., being in the "wrong place at the wrong time," such as in a bank during a robbery), others trivial or of no consequence (e.g., humming a song and then turning on the radio to find that the song is being played), or positively fortuitous (such as the chance meeting of the "love of one's life"). However, if the notion of "threat" is expanded to include events which, although

not *physically* threatening, can nonetheless intrude on and disrupt an individual's

subjective sense of existential coherence, sense of self-determination and expectancy, or

the stability of beliefs about his or her personal reality, then chance events could to varying

degrees be construed as "threat" agents with potentially as much psychological salience

for an individual life as a missile attack or a poltergeist haunting. Further, to the extent

that chance events are unpredictable and replete with uncertainty, it would be expected

that they be responded to in similar ways in order to reduce their ambiguity (e.g., through

attributions to an external agency, fate, etc.). Some evidence would support this

expectation. Findings that unusual coincidences are often interpreted within a

transpersonal, spiritual/religious, or paranormal frame of reference, such as for example,

the intervention of fate or a divine being or as revealing the presence of a numinous

unifying force in nature (e.g., Hay, 1990; Henry, 1993; Hladkyj, 1994; Hladkyj & Johnson,

1999) are suggestively consistent with a reduction-of-ambiguity hypothesis.

Thus, a third formal hypothesis in this study is that lower tolerance of ambiguity

will be associated with (a) higher scores on the transpersonal and paranormal

interpretation sub-scales of the Chance and Coincidence Questionnaire (CCQ; Hladkyj &

Johnson, 1999); (b) higher levels of desire for control, on the basis that the ambiguity of

information is a threat to more basic perceptions of control; (c) increased levels of

emplotment on the conceptual grounds that emplotment reduces the ambiguity of meaning

inherent in the unemplotted chance event, and following as a consequence of these three;

(d) higher ratings on the Personal Meaning Index of the Life Attitude Profile (LAP; Reker,

1996).

Additionally, a fourth hypothesis of this study is that individuals low in tolerance of

ambiguity will exert greater effort to "reduce the ambiguity" inherent in an "emplotment task" (as measured by time spent on task, and success at the task; described in the Method section). Finally, a fifth rather more speculative but related hypothesis that relates tolerance of ambiguity and desire for control is that they will interact in such a way that individuals designated as "high" in the desire for control and "low" in tolerance of ambiguity will be particularly persistent in their efforts at the emplotment task; whereas those low in the desire for control and high in their tolerance of ambiguity will be less motivated to "emplot" the stimulus materials in the experimental task, and thus, less persistent.

Possibility of an Emplotment "Intervention"

The importance of personal control as a psychological mediator of health and well-being has been well established over the last several decades (for extensive reviews, see Rodin, 1986; Shapiro, Schwartz, & Austin, 1996). For example, perceptions of control have been associated with positive psychological adjustment to breast cancer (Taylor, Lichtman, & Wood, 1984), reduced levels of depression in cancer patients (Newsom, Knapp, & Schulz, 1996), better psychosocial adjustment following heart attacks (Helgeson, 1992), and even to such "hard measure" outcomes as increased immune system functioning (Rodin, 1986). Much of the impetus for this research can be traced to Schulz's (1976) now-classic field experiment which showed that giving retirement home residents even small amounts of personal control (in this case, control and prediction over visiting hours) resulted not only in increased self-ratings of subjective well-being, but as well both increased objective health ratings assessed by their care providers and in dosage

reductions of their daily medication. In incremental and cumulating ways, the research on primary control over the previous several decades has led to something of a small revolution in health care which now, almost routinely, includes the patient as an active participant in health care decision-making processes (Aasen, 1987).

Similarly desirable effects have also been found for "secondary" control (e.g., finding personal meaning in one's situation) in the health domain. For example, beneficial relationships have been found between the use of secondary control and coping effectiveness in nursing home residents (Shaw, 1992), reduced levels of depression in low primary control HIV-positive men (Thompson, Nanni, & Levine, 1994), reduced distress in children about to undergo medical procedures (Weisz, McCabe, & Dennig, 1994), and in increased levels of life satisfaction in the elderly (Hladkyj, Chipperfield, Perry, & Pelletier, 1998). Although the amount of research using secondary control as the core construct has been much less than research focussed on the effects of primary forms of control and tends to be more descriptive and quasi-experimental in character, it nonetheless points toward the importance of secondary control in health-related outcomes.

The positive effects of primary control perceptions have also been studied in the educational domain where it has been repeatedly found that students who believe that they can have control over their academic experience (for example, by recognizing that their efforts, which can be self-regulated, may matter more than their natural abilities, which cannot) tend on average to perform better academically in terms of test scores and course grades (e.g., Magnusson & Perry, 1989; Perry, 1991; Perry & Magnusson, 1989). Further, this research has led to the incremental development of a cognitive intervention -- "attributional retraining" -- designed to assist academically at-risk students in enhancing

their primary control perceptions (e.g., Menec et al., 1994; Perry & Struthers, 1994).

More recently, this stream of research has incorporated a secondary "interpretive control"

component, which, in several longitudinal studies, has shown that first-year students who

spontaneously "emplot" their unchosen experiences maintain higher levels of academic

motivation across the school year than students who do not (Hladkyj, Taylor, Pelletier, &

Perry, 1998), have lower levels of stress at the end of the year, and report more positive

feelings of personal adjustment to university (Hladkyj, Pelletier, Drewniak, & Perry,

1998).

It is relatively straightforward to provide people with the information and

opportunities to enhance their perceptions of primary control, for example, by fostering

personal choice in their day-to-day experience (as in Schulz's [1976] previously cited

study) or through cognitive therapies that enhance self-agency beliefs (as in attributional

retraining). Further, the effects and outcomes of primary control interventions can be

easily measured and evaluated (e.g., objective changes in the recognized markers of

health, or in students, increased course grades). However, the same cannot be said of

interpretive control interventions, a term I have not actually encountered in the literature,

but will use broadly to designate therapeutic efforts to increase well-being through

autobiographically reflective means.

The most easily identifiable class of interventions that could be construed as

employing interpretive control processes and which have been the object of empirical

research are those grounded in reminiscence and "life-review" work with elderly

populations.[28] As Mirriam (1993) has noted, despite widely and clearly *inconsistent*

research findings concerning the efficacy of reminiscence therapies (such as journalling,

group reminiscence, storytelling, etc.), researchers and practitioners remain optimistic of

the potential benefits of these techniques, perhaps because of a post-modern "romance

with personal meaning" that "empowers" the individual by "promot[ing] our cherished

modern ideal of freeing people to voice their experiences without control by others"

(Luborsky, 1993, p. 445). In an extensive *non*-evaluative review of research findings on

reminiscence-based therapies in gerontology, Haight and Hendrix (1995) itemized the

findings of 22 reminiscence studies done between 1990-1993. Together, these studies

measured various outcomes, such as depression, anxiety, ego-integrity, death anxiety, and

life satisfaction. Of the 14 studies in the review set that had quantifiable results, only six

of the studies found statistically significant and desirable consequences associated with

reminiscence therapy. However, to be fair, it should be noted that none of the therapies

resulted in negative consequences to the participants, even though the hypothetical

possibility had been raised that reminiscence therapy may increase depression in the elderly

by creating a "longing for times gone by" (Parker, 1995, p. 518).

However, the lack of consistent empirical support for the benefits of reminiscence

are not entirely dissuasive for several reasons. First, the various therapies that have been

used cannot be considered directly comparable. Some of the studies cited by Haight and

Hendrix (1995) employed reminiscence in a verbal group therapy setting, others used a

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Of course, narrative-analytic therapy techniques are used outside of gerontological research (e.g., Hermans & Hermans-Jansen, 1995; Mattingly, 1994; Neimeyer & Stewart, 1996)), but these are very often grounded in semi-quantitative paradigms, highly complex in their execution, or so ideosyncratically and uniquely linked to their practitioners that discussion of them is beyond the scope of this thesis.

single-participant taped interview/questionnaire format or used written autobiography as the reminiscence technique. Second, sample sizes in the studies were of the size typically regarded as small (mean $n = 69$, with an approximate modal $n = 25$), and as such, may have prevented the statistical detection of all but the largest of effects. Third, and perhaps most important of all, is that research on the effects of life review has been, with the exception of several studies implicating it in connection with near-death experiences in all ages, entirely restricted to studies using elderly samples (Mirriam, 1993). I suggest that this third reason may be the most important reason for the lack of significant findings simply because of a ceiling effect related to the ages of the participants, whom, after all, because of their longevity and life experience would have already had more accumulated natural experience in interpreting the meaning of their lives than any other age group. As a consequence, it might be the case that the researcher-presumed "experimental salience" of any particular interpretive therapy may be experienced as trivial and insignificant by the "age-enwisdomed" participants.[29]

Although it is entirely reasonable on pragmatic grounds that *gerontological* research on the effects of autobiographical therapies *should* properly use *gerontological* populations, Mirriam (1993) notes that because of the absence of research on the role of reminiscence and life-review in the lives of younger adults, there is "little to support the notion that the process of the life review is age-dependent" (p. 167). I would extend this critique, and suggest that there is equally no good reason to think that people of any age

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[29]

A peer who spent several months as an interviewer for a gerontological survey told me of often feeling like "an infant" asking the survey questions, or could sense by the interviewees' expressions that their participation seemed to be more motivated by a kind of pity and caring to "help out" the interviewer than by any authentic interest in the research. When I hear of these impressions, I cannot help but to wonder *who, really,* are the "naive subjects" in gerontological research?

group should be either more or less inclined to reflect on their experiences in order to understand them than any other age group, and that it may rather be the case that the concepts we traditionally call "reminiscence" and "life review" have become, so to speak, trapped in the gravity of the paradigm that gave birth to them.[30]

Having said this, it seems logical that in order to detect the effects (as a prelude to understanding) of any interpretive or emplotment-based intervention designed to enhance or accelerate the construction of meaning and coherence beyond that which might naturally occur with the passage of time, then it might be more profitable to enter into this inquiry by turning to younger (rather than older) samples for whom issues of self-identity, existential meaning or purpose-in-life may be less certain, and for whom the interpretive skills of "controlling meaning" are perhaps less consolidated than in the elderly. Incorporating this line of reasoning, and on an exploratory basis, I also examined whether each of two experimental emplotment tasks, designed at one level to test several of the formal hypotheses of the study (previously described) could, at another level, be construed as being possible prototypical "interventions." This exploration was done in two ways: first, by conducting several between groups comparisons on a post-task measure administered immediately following completion of the task, and second, through several pre-post "within-subjects" comparisons of the scores on a 6-week follow-up readministration of the Narrative Emplotment Scale and the Life Attitude Profile, along with several measures designed to assess and subjectively felt "changes" in their lives that

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Much the same way, for example, in which the concept of synchronicity (i.e., meaningful coincidence) became trapped first in the gravity of analytical psychology, and then parapsychology; and then more or less ignored by all other branches of psychology.

participants experienced since the start of the study. It was reasoned that significant

differences on the post-task questionnaire, or pre-post differences in the test groups

(relative to the control groups) on any or all of these measures might be conceived of as

being due to the effects of engaging in the emplotment task, and might thus suggest that

the task itself may have "kindled"[31] a degree of autobiographical or interpretive reflection

in the participants that persisted after the demands of the experimental requirements were

satisfied. Such findings, if they were to occur, would suggest the possibility of developing

a therapeutic technique to assist individuals suffering from psychological discomfort

related to the loss or absence of meaning or narrative coherence in their lives. On this

basis, several exploratory post-test analyses were undertaken on the grounds of pragmatic

possibility.

Summary of Hypotheses

Before describing the design of the study in detail, it may be useful to briefly

summarize the hypotheses that have been developed.

Hypothesis 1. The first hypothesis concerns the desire for control, and states that

the desire for control will be positively correlated with (a) scores on the Narrative

Emplotment Scale, (b) scores on the Possible Lives Questionnaire, and (c) scores on the

Chance and Coincidence Questionnaire. Confirmation of these relationships would

support the conception that the desire for control extends beyond the desire to control

events that are controllable and extends also to those events that are not controllable via

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The notion of "kindling" is here used to refer to the idea that initially small effects may increase over time. For example, some preliminary evidence exists that in some students the initially small effects of attributional retraining on academic achievement "seem" to disappear after about a year, but then reemerge, with a larger effect size, two years later (Perry et al, 2001).

the "control of meaning."

Hypothesis 2. The second hypothesis concerns the consequential relationship

between desire for control and (a) existential well-being, in which it is hypothesized that

the desire for control will be positively associated with scores on the Personal Meaning

Index of the Life Attitude Profile, and (b) persistence in an emplotment task, in which it is

expected that high desire for control participants will show increased persistence with an

emplotment task than those low in the desire for control.

Hypothesis 3. The third hypothesis concerns the tolerance of ambiguity and states

that (a) low tolerance of ambiguity will be associated with higher scores on the

transpersonal and paranormal interpretation sub-scales of the Chance and Coincidence

Questionnaire, which would support the conception that these interpretations serve to

lessen the perceived ambiguity of chance events; (b) low tolerance of ambiguity will be

associated with higher levels of desire for control, supporting the suggestion that

ambiguity constitutes a threat to perceptions of control; (c) low tolerance of ambiguity

will be associated with higher scores on the narrative emplotment measure, and following

from these, (d) low tolerance of ambiguity will be associated with higher scores on the

Personal Meaning Index of the Life Attitude Profile, indicating that the reduction of some

of life's ambiguities through the emplotment of chance events can have positive

consequences for existential well-being.

Hypothesis 4. The fourth hypothesis is that low tolerance of ambiguity will be

significantly associated with greater persistence on an emplotment task, reflecting the

conception that the creation of meaning reduces ambiguity.

Hypothesis 5. Although more speculative in character, the fifth hypothesis is that

desire for control and tolerance of ambiguity will interact in the emplotment task. Specifically, it is expected that individuals classified as "high" in their desire for control and "low" on tolerance of ambiguity will show the greatest persistence in an emplotment task, whereas those classified as "low" in desire for control and "high" on tolerance of ambiguity will show the lowest persistence on the task.

Exploratory analysis. An exploratory analysis of the data was conducted to observe any immediate post-task between-groups differences or any pre-post "within-subjects" change in the emplotment and existential well-being measures as a consequence of engaging in the emplotment task. Compared to a pre-post only control group, any significant increase in emplotment or existential well-being scores following the emplotment task might be construed as indicating that the task itself in some way "kindled" a level of autobiographical or interpretive reflection in the participants that persisted after the emplotment task was completed, and thus, would suggest the possibility of the future development of a therapeutic emplotment technique.

METHOD

Participants

Data were collected from 551 participants, all of whom were recruited at two

separate time periods from several sections of an Introductory Psychology course in

exchange for course credit. However, due to missing data, the effective sample size was

514 (basic demographic information is summarized in Table 1). Subsequent missing data

from one additional person reduced the total to 513. Of this total, 471 were recruited at

the beginning of the study. Four hundred and twenty (420) of these early recruits served

in one of several experimental groups and were told they would be required to attend

three separate sessions that would involve completing several paper-and-pencil

questionnaires in the first session ("Phase I"), several creativity tasks in the second session

("Phase II"), and a follow-up questionnaire in the third session ("Phase III"). The

remaining 51 of these initial participants served in a "pre-post" condition and were told

they would be required to attend two sessions (Phase I & Phase III only). The remaining

42 participants were recruited toward the end of the study, and served in a "post-only"

condition.

Phase I

Independent Measures

Desire for control. Desire for control was measured using Burger's (1992)

Desirability of Control Scale (DC; see Appendix I). The scale consists of 20 Likert-style

first-person statements answered on a 7-point scale in which higher ratings indicate greater

agreement with each statement (e.g., " I prefer a job where I have a lot of control over

what I do and when I do it," or "I enjoy having control over my own destiny"). Scoring

Table 1

Sample demographics

Variable	Category	N	Valid Percent	Total
Age	Less than 18	1	0.2	
	18-19	333	64.8	
	20-21	106	20.6	
	22-25	53	10.3	
	26-30	8	1.6	
	31-36	7	1.4	
	37-43	3	0.6	
	44 +	3	0.6	
	missing	37		551
Gender	Male	218	42.4	
	Female	296	57.6	
	missing	37		551
Marital status	single, never married	305	59.4	
	non-cohabiting relationships	170	33.1	
	common-law	23	4.5	
	married	11	2.1	
	separated	3	0.6	
	divorced	1	0.2	
	missing	38		551
Ethnicity	European/Caucasian	396	77.3	
	Aboriginal North American	15	2.9	
	East Indian	12	2.3	
	Asian	60	11.7	
	Middle Eastern	6	1.2	
	African	15	2.9	
	Central American	4	0.8	
	South American	4	0.8	
	Australian	0	0.0	
	missing	39		551
Religion	Christian	313	61.3	
	No religion	140	27.4	
	Others (Hindu, Buddhist, Islamic, Jewish)	58	11.3	
	missing	40		551

of the DC scale is accomplished by summing the ratings of all 20 items (after reverse

coding several items). Higher scores indicate greater desire for control. In the

current study, internal reliability of the DC scale was found to be $\alpha = .80$ (consistent with

reliabilities reported by Burger in other studies, ranging from $\alpha = .74$ to .81) with a six-

week test-retest reliability of $r = .75$. Construct validity of the DC scale is supported by

the observation that desire for control scores are positively associated with personal

beliefs in the ability to control chance outcomes (Burger & Cooper, 1979), and

discriminant validity supported by low correlations with both Locus of Control ($r = -.19$)

and Social Desirability ($r = .11$; Burger & Cooper, 1979).

Tolerance of ambiguity. Tolerance of ambiguity was measured using McLain's

(1993) Multiple Stimulus Types Ambiguity Tolerance scale (MSTAT; see Appendix II).

The MSTAT consists of 22 Likert-style first-person statements answered on a 7-point

response scale in which higher ratings indicate greater levels of agreement with each item

(e.g., "I'm drawn to situations that can be interpreted in more than just one way," or "I

have little trouble coping with unexpected events"). The total MSTAT score is

determined by summing the ratings for all 22 items (after reverse coding several items).

Higher total scale scores indicate higher tolerance of ambiguity. McLain reports internal

reliability of the scale (Cronbach's Alpha) as $\alpha = .86$. In the current study, internal

reliability of the scale was found to be $\alpha = .88$. The MSTAT has a 6-week test-retest[32]

reliability of $r = .93$. Concurrent validity of the scale is supported by the observation that

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[32]

Because McLain had not reported test-retest reliability of the MSTAT, prior to the collection of data for this study, a pilot study on a different sample ($N = 138$) was done to determine the 6-week test-retest reliability of the instrument.

MSTAT scores positively correlate with other older measures of ambiguity tolerance $r =$ .37 with Budner's (1962) scale; $r = .36$ with Story & Aldag's (1983) scale; and $r = .58$ with MacDonald's (1970) scale (as cited in McLain, 1993). Construct validity of the scale is supported by a significant negative correlation ($r = -.34$) with Troldahl and Powell's (1965) Dogmatism scale (which measures the inflexibility of an individual's system of beliefs about reality) and positive correlations with both Dunham's (1989) Receptivity to Change scale ($r = .58$) and MacCrimmon and Wehrung's (1986) measure of sensation-seeking and risk-taking ($r = .38$) in ambiguous situations (all as cited in McLain, 1993).

Dependent Measures

Narrative emplotment. Emplotment was measured using three conceptually and empirically interrelated measures: the Narrative Emplotment Scale (Hladkyj, 1998a; see Appendix III), the Possible Lives Questionnaire (Hladkyj, 1998b; see Appendix IV), and the Chance and Coincidence Questionnaire (Hladkyj & Johnson, 1999; see Appendix V).

The Narrative Emplotment Scale is an eight item Likert-style scale measuring the extent to which respondents experience and perceive that chance events, coincidences, and unchosen experiences have self-relevant order, meaning, and value. Two example items are "coincidences that I have experienced often seem to have a kind of strange or mysterious personal meaning for me," and "random events and chance happenings often seem to me to be like hints or clues for me to understand both who I am and my life as a whole." The narrative emplotment score is determined by summing the ratings of each of the eight items. Higher total scale scores indicate a greater tendency to narratively emplot chance, coincidence, and unchosen experience. In the current study, the scale was found to have an internal reliability (Cronbach's Alpha) of $\alpha = .78$, with a 6-week test-retest $r =$

.70. These values are consistent with those found in previous studies (e.g., Hladkyj,

Perry, & Pelletier, 2000) using an earlier 7-item version of the scale[33] (internal reliabilities

[αs] ranging from .76 to .81, and in two longitudinal studies, 6-month test-retest

reliabilities of r = .62 and .61). Construct validity of the NES is supported by small yet

significant positive correlations, repeatedly found in several studies, with students' feelings

of adjustment to university (rs = .16 and .12, ps < .05), trait optimism (rs = .15, .11, and

.17, ps < .05), and student's positive expectations for the future (rs = .20 and .22, ps <

.01). Emplotment scale scores have also been found to be positively correlated in several

studies with university students' use of metacognitive learning strategies such as cognitive

elaboration (rs = .36, .31, and .33, ps < .001) and critical thinking (rs = .37 and .36, ps <

.001), both of which measure the student's tendency to reflect upon and organize new

information into more complex internal networks or schemas of meaning and

comprehension.

The Possible Lives Questionnaire. The second dimension of emplotment was

measured using the Possible Lives Questionnaire (PLQ; Hladkyj, 1998b; see Appendix

IV). The PLQ is an 8-item Likert-style scale designed to measure how easy (or difficult)

individuals find it to realistically imagine drastically different future possibilities in their

own lives. The measure was factorially derived from an item pool of 30 different future

life possibilities. Some of the possibilities are culturally normative (e.g., getting married,

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[33]

The earlier 7-item version of the scale did not have the item "I often have a strange feeling that some
things that have happened to me have happened for a reason, as if they were supposed to happen."
Additionally, one item in the scale was reworded from "Based on my experience, negative events in
my life, or events that I would not have chosen for myself, in the end have made me a better person"
to "Based on my experience, negative events in my life, or events that I would not have chosen for
myself, in the end have made me a *different* person."

raising a family), whereas other possibilities are either socially aberrant (e.g., becoming a criminal or drug addict), culturally atypical (e.g., joining a religious cult or becoming a hermit), individualistically romantic (e.g., becoming an adventurer or a leader of a political movement), or tragic (e.g., being murdered or dying before one's time in an accident). Factor analysis of the 30 possibilities revealed eight orthogonal factors, and the final reduced measure was constructed by simply taking the highest loading single item from each of the eight factors. In effect, these eight items can be construed as representing the broadest range of life possibilities from the original set. Thus, the sum of ratings for all eight items can be seen as constituting a single measure of the breadth of the individual's autobiographical imagination. A multidimensional scaling (MDS) analysis (using Euclidean distances) was used to confirm the dissimilarity of the sample items (Kruskal's $S = .12$, R-square $= .93$). Six-week test-retest reliability[34] of the scale is $r = .69$.

The Chance and Coincidence Questionnaire (CCQ; Hladkyj & Johnson, 1999; see Appendix V) was the third emplotment measure used in this study. The CCQ measures the range and extent to which the respondent has experienced self-relevant chance events and coincidences, and interpreted them as paranormally or transpersonally meaningful (i.e., as "synchronistic" [Jung, 1952/1969]) or has recognized and valued these experiences in his or her life. The scale consists of 35 Likert-style items answered on a 7-point scale where low responses indicate minimal experience and high scores indicate maximal experience. Sample items are "I have had experiences where, by chance, I ran into or met someone I knew in a place that neither of us would have expected to meet," "I

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[34]Determined from pilot study.

have had experiences of chance events or coincidences that left me with the feeling that the events had been orchestrated or planned by a mysterious unseen force," and "I have met my best friends through chance and coincidences." The internal reliability (Cronbach's Alpha) of the scale is $\alpha = .91$, and has concurrent validity is supported by positive correlations with scores on Hood's (1975) Mysticism Scale (a measure of spiritual & religious experience; $r = .50, p < .001$), Tellegen's (1974) Absorption Scale (a trait-like measure of how attentively engaged or imaginatively "absorbed" a person tends to be in their own thoughts and experiences; $r = .50, p < .001$), and with the Openness to Experience scale of Goldberg's (1992) "Big Five" Personality Inventory, $r = .18, p < .05$ (Hladkyj & Johnson, 1999). In the current study, the CCQ was found to have an internal reliability (Cronbach's Alpha) of $\alpha = .90$.

Concurrent validity of the three emplotment measures is supported by significant and positive correlations among the three scales (Table 2)

Table 2

Inter-correlations of three emplotment scales ($n = 483$)

	NES	PLQ	CCQ
1. Narrative Emplotment Scale (NES)	-	.33***	.66***
2. Possible Lives Questionnaire (PLQ)		-	.27***
3. Chance and Coincidence Questionnaire (CCQ)			-

*** $p < .001$

Existential meaning and purpose. Existential meaning and purpose were measured using Reker's (1996) Life Attitude Profile (Revised) (LAP-R; see Appendix VI). The

LAP-R is a 48-item Likert-style questionnaire measuring six dimensions of meaning and

purpose-in-life (i.e., goal-seeking, sense of purpose or "mission" in life, sense of

coherence, choice and responsibility, death acceptance, and existential vacuum). The six

dimensions are combined (by simple summation) to create two scores: a "Personal

Meaning Index" (which measures the person's sense of having a direction and a purpose in

life), and an "Existential Transcendence" score which measures the extent to which a

person has attained a "new perspective on life...risen above the failures of living, has a

good understanding of self... accepts the prospect of personal death, has an appreciation

for past, present, and future, and views life as inevitable and meaningful" (Reker, 1996, p.

20). As reported by Reker, internal reliability (Cronbach's Alpha) of the six subscales and

the two composite indexes range from α = .77 to .87 (for the subscales), and α = .88 to

.91 (for the composites) across both age and gender. Six-week test-retest reliabilities of

the subscales and composite indices range between r = .77 to .90. Concurrent validity of

the LAP-R scales and composites is strongly supported by significant correlations with

numerous related measures. Table 3 (below) shows correlations of the LAP-R's two

major indices -- the Purpose and Meaning Index (PMI) and Existential Transcendence

(ET) -- with a partial list of related measures (for complete detailed information on validity

studies of all LAP-R subscales and composites, see Reker, 1996).

In the current study, internal reliabilities (Cronbach's Alphas) for the subscales

were found to range between α =.72 and .90 (goal-seeking, .72; existential vacuum, .75;

choice & responsibility, .82; coherence, .83; purpose, .84; death acceptance, .88;

existential transcendence index, .84; and personal meaning index, .90). Six-week test-

retest reliabilities ranged from r = .60 to 75.

Table 3

Correlations of LAP-R major indices (PMI and ET) with other measures[a]

Measure	PMI	ET
Purpose in Life Test (Crumbaugh & Maholick, 1969)	.82**	.81**
Life Regard Index (Battista & Almond, 1973)	.81**	.78**
Sense of Coherence (Antonovsky, 1987)	.50**	.52**
Alienation Scale (Dean, 1961)	-.46	-.49**
(External) Locus of Control (Reid & Ware, 1974)	-.40**	-.40**
Death Acceptance (Wong, 1992)	-	.41**
Death Fear (Wong, 1992)	-	-.38*
Optimism (Scheir & Carver, 1985)	.29	.40**
Beck Depression Inventory (Beck, 1967)	-.40**	-.43**
Life Satisfaction Index (Wood, 1969)	.58**	.57**

** $p < .01$
[a] all as cited in Reker, 1996

Potential Covariates

Two additional measures -- perceived stress and narcissism -- were included in the

Phase I questionnaire battery as potential covariates in regression and ANCOVA

analyses.[35]

Perceived stress. Because of some evidence that shows that tolerance of

ambiguity can be attenuated by stress (e.g., Friedland & Keinan, 1991), a modified

version of the original Cohen, Kamarck, and Mermelstein (1983) Perceived Stress Scale

developed and used by Perry in numerous studies using university students (e.g., Perry,

Hladkyj, Pekrun, & Pelletier, in press) was included in the questionnaire (Appendix VII).

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[35] Following the recommendations of Keppel & Zedeck (1989), if potential covariates were found to correlate .20 or higher with any dependent measure, then they were included as a covariate in any ANCOVA analyses. If the covariate was found to correlate less than .20, then it was dropped, because ANOVA is a more powerful test.

The scale consists of seven items which ask the respondent to estimate, on a 5-point Likert scale, how frequently (i.e., 1 = never, through 5 = very often) he or she has experienced stressful feelings in the previous month (e.g., "How often have you found that you could not cope with all the things you had to do?," and "How often have you been angered because of things that happened that were outside of your control?"). A total chronic perceived stress score is computed by summing the ratings for each of the items. Internal reliability (Cronbach's Alpha) of the shortened scale has been found to be consistent across different samples of university students (αs = .84 and .85; Perry, 1997, 1998) and has a test-retest reliability of r = .64 (Perry, 1998). Construct validity of the scale is supported by positive correlations with self-reported student absenteeism from class (r = .19, p < .01), number of doctor visits during the school year (r = .13, p < .01), frequency of negative emotions associated with educational experience (r = .45, p < .001), and test anxiety (r = .50, p < .001); and by negative correlations with optimism (r = -.52, p < .001), perceived control (r = -.31, p < .001), students' global subjective perceptions of both physical health (r = -.25, p < .001) and psychological health (r = -.47, p < .001), and overall feelings of adjustment to university (r = -.29, p < .001; Hladkyj, Pelletier, Drewniak, & Perry, 1998). In the current study, internal reliability of the stress scale was found to be α = .84.

Narcissism. Because this study required individuals to, in part, reflect on certain aspects of their personal lives and identities, individual differences in existing levels of positive self-regard, self-preoccupation, and egocentricity could potentially bias questionnaire responding (e.g., those with high levels of narcissism might have a tendency to read greater levels of self-relevant meaning into chance events relative to those low in

narcissism).   Thus, a standard measure of narcissism was included in the questionnaire

battery in order to check for any confound effects of narcissism and, if required, to

statistically adjust the dependent measures for these pre-existing differences in the planned

analyses.   The 40-item "public domain" version of the Narcissistic Personality

Questionnaire (NPI; Raskin & Hall, 1979, 1981; Raskin & Terry, 1988) was included in

the questionnaire battery to measure narcissism (see Appendix VIII).   Unlike other

measures used in this study, the NPI is a forced-choice measure in which respondents

choose which one of two oppositional first-person statements is more self-descriptive

(e.g., "I would do almost anything on a dare," vs. "I tend to be a fairly cautious person").

The scale is designed to measure seven interrelated components of narcissism: "Authority"

(perceptions of the self as an authority, a born leader), "Exhibitionism" (desire for and

enjoyment of attention from others), "Superiority" (perception of oneself as special,

unique), "Entitlement" (belief or expectation that one deserves bestowals, special

treatment, etc.), "Exploitiveness" (manipulating situations and others for self-

enhancement), "Self-sufficiency" (perceptions of self as competent and capable), and

"Vanity" (admiration of one's body).

Although the seven separate NPI subscales do not have particularly high levels of

internal reliability (authority, α = .73; exhibitionism, α = .63; superiority, α = .54;

entitlement, α = .50, exploitiveness, α = .52; self-sufficiency, α = .50; vanity, α = .64, as

reported by Raskin & Terry (1988), the full scale has a Cronbach's Alpha of α = .83.

NPI subscale and full scale reliabilities in the current study very closely replicated

those reported by Raskin and Terry: authority, α = .71; exhibitionism, α = .64; superiority,

α = .53; entitlement, α = .43, exploitiveness, α = .57; self-sufficiency, α = .48; vanity, α =

.59; with full scale reliability of α = .83.

Demographics. Demographic information collected was age, sex, marital status, ethnicity, and religious identification (see Appendix IX).

<div align="center">Phase II</div>

Task Materials

Materials for Phase II of the study consisted of (a) a set of 20 stimulus images (appx. 6 cm x 4 cm), each in a small envelope, and all contained in a larger envelope, (b) a stick of glue, (c) a task booklet containing a "memory grid," one of two different versions of instructions, a recording form, a blank page, and (in some conditions) one of two versions of an autobiographical task form.

Twenty stimulus images. Twenty black and white stimulus images (Appendix X) were used in Phase II of the study. Each image was approximately 6 cm. x 4 cm., and derived (via computer manipulation) from photographs taken or obtained by the researcher. The selection of images was based on Toglia and Battig's (1978) catalogue of semantic word norms. The catalogue lists 2,854 English language words, along with mean inter-rater judgements (made by more than 2,500 Introductory Psychology students) on seven qualitative dimensions (i.e., concreteness, imagery, categorizability, meaningfulness or associability, familiarity, pleasantness, and number of features or attributes). The words are grouped into eight clusters on the basis of the ratings. In the current study, only words from "Cluster 7" and "Cluster 8" were used, as these clusters contain words having the highest ratings on concreteness, imagery, and meaningfulness. The researcher examined the clusters, and selected 20 words using the following process: First, the words were chosen for their practical "photographability," which resulted in a

list of 194 words. The selected words, along with their mean ratings on the dimensions of

concreteness, imagery, and meaningfulness were then entered into an SPSS spreadsheet.

A total "salience" score was then calculated by summing each of the three ratings for each

word, and the mean salience score of all the words was calculated ($\underline{M}$ = 16.43). The

words were then rank-ordered on the total salience score (see Appendix XI), the word

having the closest score to the mean ("saxophone," $\underline{m}$ = 16.42) was then marked as the

"anchor," and every ninth word above and below the word saxophone was then selected.

In cases where a selected word was too similar to another word already selected (e.g.,

"dress," and "pants," "mouth," and "tongue"), the adjacent word was selected instead.

The result was the following 20 stimulus words:

Boat	Book	Telephone	Gorilla	House
Sandal	Highway	Clown	Mouth	Dress
Rabbit	Turtle	Drum	Toilet	Cloud
Spider	Bucket	Pen	Skull	Nail

The researcher then either photographed or obtained an existing image of the objective

referent of each of the words. Each of these photographs was scanned into a computer

file and manipulated with a graphics program to produce a simple "line drawing" rendering

of the original image. These images were then duplicated and each image placed in a small

coin envelope and arranged into sets of 20, in sufficient number for the study. Each set of

20 images in small envelopes was then shuffled and loosely inserted into a larger envelope

(9" x 12").

Random Picture-Memory Task Booklets. The Random Picture-Memory Task

package consisted of several components. The main component (labelled a "memory

grid") was an arrangement of 30 empty rectangles organized in a 3 x 10 layout across 2

pages in a "booklet" form. The left-most column of rectangles was labelled "memory 1,"

"memory 2,"..."memory 10." The middle column was labelled "image 1," "image

2,"..."image 10." The right-most column was labelled "explanation 1," "explanation 2,"...

"explanation 10" (see Appendix XII). Along with this blank grid were one of four

different sets of instructions (see Appendix XIII), a blank sheet of paper labelled

"PLEASE GLUE UNUSED IMAGES ON THIS PAGE" (Appendix XIV), one of two

different task record sheets (see Appendix XV), and/or, in some conditions, one of two

different autobiographical task forms and an embedded post-task questionnaire (contained

as part of Appendix XIII).

<div align="center">Phase III</div>

Follow-up Questionnaire

The follow-up questionnaire used in Phase III of the study consisted of a

readministration of the Life Attitude Profile (revised) (LAP-R; Reker, 1996) and the

Narrative Emplotment Scale (Hladkyj, 1998a), both previously described. In addition to

these scales, the follow-up questionnaire also contained a section consisting of 19

additional items (Appendix XVI) which asked the participant to rate, on a scale from 1 to

7, the *extent of change* in various "aspects and experiences of life" over the "last several

months" (1 = much less, 7 = much more). Participants were asked "to what extent have

the following aspects and experiences of life changed for you in the last several months?,"

followed by the list of 19 aspects of life, such as "clarity about your goals in life?,"

"happiness with life-in-general?," "feelings that you life is in control?," and so on.

Broadly, the construction of the list of "aspects and experiences" in this section of the

follow-up questionnaire was intended to reflect, in a global manner, the ostensible content

measured by the scales used in the Phase I questionnaire[36]. For example, the item "clarity about your goals in life?" was intended as an alternate single-item measure of the Goal-Seeking subscale of the Life Attitude Profile, the item "feeling that your life makes sense to you?" as an item reflecting Narrative Emplotment, and so on.

Procedure

General overview of the design of the study. As noted previously, the study was conducted in three separate phases covering about a 6 to 8 week period. Phase I consisted of the pre-task questionnaire. Phase II consisted of a number of experimental sessions in which participants completed one of several different emplotment tasks (either an image association task, a written autobiographical task, or both[37]). Phase III was the post-task follow-up phase of the study, and also included an additional posttest-only

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[36]

Originally, my intent had been to simply re-administer all of the scales used in Phase I in order to test for any effects of the task. This was done in the pilot study, but very few effects were observed. One possible reason for the lack of post-task effects using a "pure replication" approach may be due to the generally high internal and test-retest reliabilities of most of the measures, which would, by definition, make them "resistant" to change in the relative short term by all but the most powerful of treatment or task effects. In addition, because some participants would no doubt recognize the scales from Phase I, there might be some attempt on their part (unconscious or otherwise) to "be consistent" and respond to the items in Phase III in the same way as they had in Phase I. For these reasons, following the pilot study, I decided that exploring an "alternate measures" approach to the follow-up questionnaire might be more profitable.

[37]

Jung (1952/1969) maintained that the experience of meaningful coincidence ("synchronicity") involves the activation of the contents of the unconscious. In having an unconscious component, the experience of meaningful coincidence would have a spontaneous component. In considering this perspective, two different emplotment tasks were used: First, a projective task involving unchosen stimuli (randomly selected images) to prompt spontaneous associations, and second, a more traditionally conceived "autobiographical" task involving the deliberate and consciously-directed recovery of memorable coincidences. In the current author's view, the former task may have more "experimental realism" in terms of the way we "meet" chance events in real life than if we do so by intentionally recalling coincidences through deliberate autobiography, the latter of which has been the traditional way in which narrative emplotment has been approached, for example, in reminiscence or life-review therapy.

control group ($\underline{n}$ = 42) which completed the Phase I questionnaire battery (in order to test

for effects due simply to the passage of time). The diagram below represents a simple

flowchart outline of the study:

PHASE I - PRE-TASK QUESTIONNAIRE (all except "group 8")

↓

PHASE II - TASK SESSIONS							
GROUP 1 FREE- FORM IMAGE	GROUP 2 FREE- FORM WRITE	GROUP 3 FREE- FORM IMAGE + WRITE	GROUP 4 FIXED- FORM IMAGE	GROUP 5 FIXED FORM WRITE	GROUP 6 FIXED FORM IMAGE + WRITE	GROUP 7 (pre-post only) NO TASK	GROUP 8 (post- only) NO TASK

↓

PHASE III - FOLLOW-UP SESSIONS							
GROUP 1 follow-up	GROUP 2 follow-up	GROUP 3 follow-up	GROUP 4 follow-up	GROUP 5 follow-up	GROUP 6 follow-up	GROUP 7 follow-up	GROUP 8 Phase I battery only

Recruitment. Participants were recruited for the study from several sections of an

introductory psychology course. Because of the diversity of the students' individual

academic schedules, they could choose and sign up to attend one of 16 Phase I sessions

scheduled at various times on various days over a two-week period.

Assignment of conditions to sessions. Because participants chose which session

to participate in (thereby precluding random assignment), the experimental tasks

(listed under groups 1 to 6, above) were randomly assigned, by the role of a die, to each

of the sessions after all the participants signed up for the sessions they wished to attend.

Phase I: Pre-task measurement. In Phase I of the study, participants completed the

pre-task questionnaire battery consisting of the demographic measures (age, gender,

marital status, ethnicity, & religion), the potential covariates (Perceived Stress Scale,

Narcissistic Personality Inventory), the independent measures (the Desirability of Control

Scale, Multiple Stimulus Types Ambiguity Tolerance scale), and the Phase I dependent

measures (Narrative Emplotment Scale, Possible Lives Questionnaire, Chance and

Coincidence Questionnaire, Life Attitude Profile).[38] Data collection sessions took place

"en masse" in a university classroom with a seating capacity of about 40 persons.[39]

At the beginning of each session the researcher thanked the students for their

attendance and explained the contents of the questionnaire package which, in addition to

the Phase I questionnaire, contained an informed consent form and instructions for

selecting a "secret 6-digit code number" that the participants would use to identify

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[38]

To control for possible order effects, partial counterbalancing was employed, using 4 different orders of "clusters" of scales:

        Cluster 1 - demographics, narcissism, ambiguity tolerance
        Cluster 2 - possible lives, emplotment, chance & coincidence
        Cluster 3 - desire for control, stress
        Cluster 4 - life attitudes

      Order 1 - Clusters 1 — 2 — 3 — 4
      Order 2 -   "   2 — 3 — 4 — 1
      Order 3 -   "   3 — 4 — 1 — 2
      Order 4 -   "   4 — 1 — 2 — 3

This ordering was chosen to maximize the "distance" in the battery between the two IVs of the study — ambiguity tolerance and desire for control, and resulted in, any given order, the IV measures being separated by at least 3 other scales.

[39]

The number of participants varied from session to session. Because students could choose a time and day that best fit their individual schedules, some sessions (i.e., late day) were attended by as few as five students, whereas other sessions (i.e., late morning, mid-day sessions) had as many as 40 students.

themselves in future sessions[40] (see Appendix XVII). At this time, the researcher also

drew the students attention to lists of times and dates for Phase II sessions that were

spread on a table at the front of the room, and verbally instructed the students to make

sure to sign up for a Phase II session after they finished and handed in the questionnaire.

The students were then given an opportunity to ask any questions. Once any questions

were answered, they were thanked again for their participation, and allowed to do the

questionnaires.

Phase II: Task sessions. Two to three weeks after Phase I sessions were

completed, the students in the experimental conditions (Groups 1 -- 6) returned for their

Phase II sessions, in which they did one of six possible tasks[41]. Each of these conditions is

outlined below.

In the FREE-FORM IMAGE ONLY group (designated "Group 1"), students

received a task package containing a blank "memory grid," a large envelope containing the

20 images (each image in a separate small coin envelope), a pencil, a small stick of glue,

and an instruction page. The instructions asked them to first write down 10 memories in

the appropriate spaces in the left-hand column on the "memory grid," and then after

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[40]

The use of "secret code numbers" to match students' data across the phases of the study was a requirement of the Human Ethical Review Committee. It was felt that many of the items in the questionnaire, although not specified, were so deeply personal that anonymity was more appropriate than confidentiality, and the case was made that anonymity would ensure more honest responding to the questionnaire items. Thus, I used a secret code number procedure, but, on hindsight, now see that this was inefficient, given that by the end of the study about 20% of the students could not remember their code numbers, resulting in posttask data that were unable to be positively matched with data collected in the initial phases of the study. This forgetfulness was particularly surprising given that it was suggested to students that their secret code numbers be their mothers' birth dates in day/month/year format.

[41]

As in Phase I of the study, the task was randomly assigned to the session (rather than participants assigned to conditions) after students signed up.

having done this, randomly draw 10 of the small coin envelopes from the larger envelope. Each of the coin envelopes was then opened and the 10 images removed and spread out on the table. The students were then instructed to try to freely match or associate any of the 10 images with any of their 10 recorded memories. After deciding on the best "fit" of all 10 images to their memories, they were then instructed to glue each image into the appropriate space in the middle column of the grid next to the memory they had associated it with. Further, any images that could not be "connected" or "fit" to a memory were "discarded" by gluing them to a separate page of blank paper provided for this purpose. After gluing down the images the students were then asked to write a short reason for the association between their memory and the image in the adjacent empty space next to the image. They then completed the "task record sheet" (see Appendix XV). This served a dual purpose of providing the researcher with (a) a record of the associations in case the images become unstuck and (b) a check on whether or not the participant used the same word as the researcher to identify the image (e.g., "monkey" as opposed to "gorilla," etc.). Finally, the students completed a brief post-task questionnaire (see Appendix XIII) in which they were asked (a) to identify any images that caused a flood of memories, and to rate, on a scale of 1 to 7, (b) how well the images "fit" their memories, (c) how often they think about the memories they wrote down, (d) how often they think about the role of chance and coincidence in their lives, (e) and the extent to which they felt that doing the task may have prompted them to think differently about their memories than in the past.

In the FREE-FORM WRITING ONLY condition (designated "Group 2"), participants received a task package containing a pencil with an eraser and the "Chance

Events & Coincidences in My Life Story" questionnaire (see Appendix XIII), in which

they were instructed to write a prose account of the *"strangest, most unusual chance*

event that you can think of – one that stands out from all the rest, one that may have

seemed or felt to you at the time that it might have been due to something more than just

chance or something more than just a simple coincidence. " This condition was

designated as "free-form" because minimal constraints were placed on the participants:

They were free to write in any style they want and with as much or as little detail as they

chose; and if they ran out of room, they were free to use the reverse side of the page.

When the students finished writing their stories, they then completed an attached posttask

questionnaire in which they were asked to identify (a) how many parts, elements, or events

they felt were necessary for the coincidence they described, (b) what kind of event was the

"trigger" for the coincidence (e.g., meeting a stranger, being in an unfamiliar location,

etc), (c) the theme or content of the coincidence (e.g., meeting a romantic partner, being

saved from misfortune, etc.), (d) how strange or "unreal" the coincidence felt, (e) how

much perceived impact it had in the subject's life, and the nature of the impact, (f) whether

the coincidence was negative, neutral, or positive, (g) how often the person thinks about

the specific coincidence, (h) how often the person thinks about the role of coincidence in

his or her life generally, and (i) whether or not the person felt that writing about the

coincidence caused him or her to think differently about it.

In the FREE-FORM IMAGE + WRITING condition (designated "Group 3"),

participants did *both* tasks: first, the image-association task, followed by the written task.

In the FIXED-FORM IMAGE ONLY condition (designated "Group 4"), the

participants received the same task package as Group 1, but with different instructions.

Unlike those in Group 1, who were free to spread out all 10 selected images simultaneously and examine and rearrange them to find the best "fit" to their memories before glueing them down, participants in Group 4 were required to proceed sequentially: The first image was drawn from the envelope, and an attempt was made to match it to the first memory. If the first image drawn could not be matched with the first memory, then it had to be discarded (glued to the blank "unused images" page) and not used with any other memory. The second image drawn then had to be matched to the second memory, or discarded. This sequential process was repeated until 10 images had been drawn and either used or discarded. In this way, the important difference between Group 1 and Group 4 was that, in the former, participants had an immeasurably greater degree of creative freedom in doing the task; whereas in the latter, their interpretive freedom was constrained by a set of fixed rules regarding the task process.

Parallelling the constraints imposed on those in the fixed-image condition (Group 4), participants in the FIXED-FORM WRITING condition (designated "Group 5") provided a written account of a coincidence; but instead of being able to do so freely, they were constrained by the form and organization of the questionnaire they received (the "Coincidence Experience Form"; see Appendix XIII), and a list of directives in the accompanying instructions. First, the form itself required that they write only inside of small boxes, thus necessitating the curtailment of detail (unlike the free-form writing group, which could use the other side of the page if they ran out of room). Second, the boxes were to be used only for certain specified information (e.g., separate boxes for descriptions of events, time and place of event, how the event felt, etc.). Third, boxes were provided for the description of only two "events" involved in the coincidence (thus

precluding written detail of complex coincidences involving more than two events).

Fourth, participants in this condition were told to describe events that were causally

unrelated and that occurred not more than several days apart. Fifth, participants were also

required to provide two specific types of interpretations of why the coincidence occurred:

one a "feeling-based" interpretation, and the other a "scientific" interpretation (in contrast

to the free-writing group students, who were not given any directives concerning how to

think about their experiences). Regarding this fifth constraint, the instructions were

designed to impose a particular world-view on the participants' interpretations by noting

that *"most scientists do not believe in coincidences and brush them off as unscientific,*

saying that they are a form of self-delusion, illusory correlation, or superstitious

primitive thinking." As a final constraint, participants in the fixed-writing group had to

use the permanent-ink pens provided by the researcher (which prevented erasing & re-

writing, unlike the free-form writing group, who were given pencils and could erase, edit,

or re-write their stories). As with the free-form group, students in the fixed-form writing

group also completed an attached posttask questionnaire.[42]

In the FIXED-FORM IMAGE + WRITING condition (designated "Group 6"),

participants did *both* of the fixed tasks: first, the fixed-form image-association task,

followed by the fixed-form written task. Those in the pre-post only NO-TASK condition

(designated "Group 7") did not participate in Phase II of the study. Neither did those in

the post-only condition ("Group 8").

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[42]

Even though participants in the fixed-form writing condition were only provided with enough boxes
to *describe* two events in their coincidence, the posttask questionnaire was reworded in such a way as
to allow them to indicate how many events in total were involved in the coincidence. This was done
in order to enable the collection of the same posttask data as that collected from the free-form writing
group.

Administration procedures for Phase II were similar to those used in Phase I: At the beginning of each session, the students were thanked for their continued participation, and the contents of the task package were explained to them. Because of the novelty of the image-association task, the researcher took a few minutes at the beginning of each session involving this task to "work through" an example using enlarged overhead transparencies of the task materials.[43]

Following the example, the students' attention was drawn to lists of available sessions for Phase III, and the request made to them to make sure to sign up for a Phase III session before they left. They were then asked if they had any questions; and once these were answered, they were free to begin the task. As the students began working, the researcher made a note of the time; and as students finished the task and handed in the materials, he noted the number of five-minute intervals between the start time and the time that the task materials were handed in on the front of the form.[44]

Phase III: Post-task follow-up. Two to three weeks following the completion of the Phase II sessions, participants in the experimental conditions returned for Phase III of

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[43]

The pilot study revealed that although the majority of participants understood the task requirements, a few students had difficulty following the written instructions but understood what was required of them once the task was demonstrated by way of an example. In order to minimize confusion in the actual study, the decision was made to include a demonstration example at the beginning of each session that used the image-association task. In each case, the researcher used the same pair of memories and images: a "memory" of catching frogs at Grand Beach associated to the image of a turtle (because there were also turtles at Grand Beach), and a "memory" of getting in trouble for stealing a chocolate bar, which I told them I could not associate with the image of a sandal (to provide a demonstration of how to glue an unassociated image onto the "unused images" page).

[44]

To avoid raising suspicions that the task was being timed, a space on the cover of the memory grid booklet was labelled "Session Code -- to be filled in by researcher." If a student took 55 minutes to complete the task, the researcher entered an "11" in the session code space (i.e., 11 5-minute intervals = 55 minutes).

the study, in which they completed the follow-up questionnaire (previously described).

During this time, the pre-post only group (Group 7) also completed the follow-up

questionnaire, while the post-only group (Group 8) completed the questionnaire battery

from Phase I. Following the completion of the questionnaire, each participant was given a

debriefing sheet (Appendix XVIII), was thanked for his or her participation, and was free

to leave the session.

All data collection was done in strict accordance with the ethical principles of the

American Psychological Association and the procedures approved by the University of

Manitoba Department of Psychology Human Ethical Review Committee (HERC # 99-

153), and permission was obtained from the original authors to reproduce and use all

scales employed in the research that were not designed by the principal investigator

(Appendix XIX).

RESULTS AND DISCUSSION

Because of the large number of analyses required to answer the questions raised in this thesis, the Analyses & Results section has been organized in four major sections. The first section is titled "I. Preliminary Analyses," and includes information on the preparatory work done on the data (e.g., scale construction and reliability checks, instrumentation checks, etc.). The second section presents analyses done to test the formal hypotheses of the study, and is titled "II. Tests of Formal Hypothesis." This section is organized so that each hypothesis is treated in a self-contained subsection that includes *both* the statistical results *and* a discussion of the results[45]. The third section is titled "III. Supplementary Analyses," and contains analyses of the post-task questionnaire and follow-up data done to identify any effects due to participation in the study. Finally, a fourth section is entitled "IV. Additional Analysis: Predictors of Personal Meaning," which contains the results of a sequential regression of Personal Meaning Index data collected at the end of the study regressed on a core set of predictors measured at the beginning of the study.

I. Preliminary Analyses

Data Handling

Data sheets. Before the data were scanned, each NCS "bubble" response-sheet was visually examined for stray pencil marks, smudges, or incomplete erasing, the presence of the secret code number on each sheet used by each student, and for proper sheet order (i.e., first sheet on the top, last sheet on the bottom). At this time, several additional identification codes were added in the unused spaces on the last response sheet.

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[45]
A general summary discussion of the overall results, and conclusions and speculations about them follows the "II. Tests of Formal Hypotheses" section.

These codes included identification of which condition the participant was in, which Phase, which session, and which counterbalance order of the questionnaire the student had answered.

Data scanning and file creation. Data sheets for Phase I and Phase III were submitted for computer scanning separately for each session.[46] Each subsequent text output file was then examined for the presence of double responses (not easily detected by visual scanning). Any double-responses that were found were converted into missing values. The resulting files were then converted to SPSS spreadsheet files, sorted on the students' secret code numbers, and merged into a single dataset.[47] Once in this form, the data were examined for out-of-range values by running descriptive statistics on each variable in the dataset, and any out-of-range values were converted to missing data.

Manual entry of Phase II data. Data from Phase II of the study were recorded by the students directly onto the task materials and, because of this, were manually entered into the datafile. This included entering (a) student's responses to the posttask questionnaire items (recorded by students directly on the questionnaire rather than on a machine readable bubble sheet), (b) the time-on-task information recorded by the researcher, and (c) the number of images used by students in the image-association

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46

Separate-session scanning of the bubble sheets was done to ensure that in the event of a scanner jam the "damage" would be limited to only a small stack of sheets rather than the whole stack.

47

As noted previously, participants who forgot their code numbers provided data that could not be merged across phases. In addition to this, some students who participated in earlier phases of the study simply did not return to complete the study for reasons associated with introductory psychology course attrition. The merging of data across phases resulted in complete data (i.e., matched across all phases) for 316 students in the experimental group (loss of 104) and 41 students in the pre-post condition (loss of 10). In the post-only comparison group for which data-matching was not required, data were obtained from 42 students.

conditions. In addition, a record of which ten of the 20 images were drawn from the envelope by each participant in the image-association conditions was also entered at this time for the purposes of checking the frequency that each image was used.

Scale Construction & Reliability Checks

Prior to formal hypotheses tests or any descriptive or exploratory analyses, scales were constructed according to the formulas appropriate to each scale (typically a summation of items scores following the reverse coding of specific items) and internal reliability assessed. Table 4 (next page) provides a summary of this information. As can be seen from Table 4, internal reliabilities of the measures were fairly high, and consistent with those reported from others studies (previously described in the Method section).

Instrumentation Checks

Order effects. Using questionnaire order within the battery as the independent factor, one-way ANOVAs were performed on each of the variables to determine whether or not the order in which the questionnaires were completed affected participants' responses. All Fs were found to be less than 2.00, with p-value significance levels ranging between .12 to .95. On this basis, it was concluded that the order in which the various scales and questionnaires were completed had no significant effects on participants' responding.

Measurement effects. To test for any subsequent effects that answering the Phase I questionnaire itself may have had on the underlying constructs being measured, for example, by prompting self-reflection, dependent t-tests were performed on the pre-post differences associated with narrative emplotment and existential well-being (i.e., Life

Table 4

Internal Reliability of Scales/Subscales Used in Study

Scale or Subscale	Type of Item	Number of items	Internal Reliability [a]
IVs:			
Desire for Control (DC)	Scaled 1 - 7	20	.80
Ambiguity Tolerance (MSTAT)	Scaled 1 - 7	22	.88
DVs:			
Narrative Emplotment	Scaled 1 - 7	8	.79
Possible Lives Questionnaire	Scaled 1 - 7	8	Kruskal's S = .09
			R^2 = .97
Chance & Coincidence Total	Scaled 1 - 7	35	.91
subscale: Transpersonal		5	.90
Purpose		5	.85
Communication		5	.74
Instrumental Consequence		5	.83
· Pattern Perception		5	.77
Paranormal Experience		5	.77
Chance-as-Illusion		5	.62
Life Attitude Profile:	Scaled 1 - 7		
Existential Transcendence	(Full Scale)	48	.84
Purpose & Meaning Index		16	.90
subscale: Sense of Purpose		8	.84
Sense of Coherence		8	.83
Choice/Responsibility		8	.82
Death Acceptance		8	.88
Existential Vacuum		8	.75
Goal Seeking		8	.72
Covariates:			
Narcissism Total Scale	forced-choice	40	.83
subscale: Authority		8	.71
Exhibitionism		7	.64
Superiority		5	.53
Entitlement		6	.43
Exploitiveness		5	.57
Self-Sufficiency		6	.48
Vanity	-	3	.59
Perceived Stress	Scaled 1 - 5	7	.84

[a] unless otherwise noted, values are Cronbach's Alpha

Attitude Profile scores) measured at the start and the end of the study in the pre-post

only control condition (Group 7). The results suggest that completing the Narrative

Emplotment Scale and the Life Attitude Profile in Phase I of the study did not have any

significant effects on subsequent responding to the same questionnaires in Phase III, as

indicated by non-significant ts for all measures, which ranged from .427 to 1.78, all ps >

.05.[48]

Temporal effects. To check for any effects associated with the passage of time,

scores on Phase I measures in the pre-post only control condition (Group 7) were

compared to the scores of those in the post-only control group (Group 8), the latter of

whom completed the identical questionnaire, but did so at the end of the study (i.e., 6 to 8

weeks later). The majority of individual t-test comparisons revealed no significant

differences, and thus provide confidence that the measurement of the constructs in this

study was relatively unaffected by the temporal context. However, three of the time-

comparisons were significant. First, scores on the transpersonal interpretation subscale of

the CCQ were slightly lower for students who completed the Phase I questionnaire later in

the term than earlier (Ms = 18.02 vs. 21.76; $t[90]$ = 2.18, p = .032). Second, acceptance

of death subscale scores from the Life Attitude Profile were also lower for those

completing the Phase I questionnaire later than earlier (Ms = 35.45 vs. 39.82; $t[91]$ = 2.15,

p = .034). Finally, scores on the exploitiveness subscale of the Narcissistic Personality

Inventory were, on the other hand, *higher* for those completing the questionnaire later

rather than earlier (Ms = 2.07 vs. 1.45; $t[91]$ = -2.16, p = .034). However, because a total

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[48]

Due to missing data from several participants in the pre-post only condition, degrees of freedom for
the individual t-tests varied from 36 to 40.

of 29 scales and subscales were tested in this analysis, to maintain the experimentwise

error rate at an a priori .05 would require setting the critical alpha for each comparison at

$p < .0017$. Clearly, none of the three $< .05$ comparisons approach this level of

significance, suggesting that the apparent differences could reflect a statistical artifact

related to the number of comparisons[49] rather real differences due to the passage of time.

However, if each of the separate tests were treated as independent, the nature of the

variables in which the three differences occur might suggest that several elements of the

constructs measured in this study may not be entirely independent of effects associated

with the passage of time.[50]

Assignment of conditions-to-sessions and group equivalencies in Phase I. As

noted previously, participants were not randomly assigned to conditions, but rather,

experimental conditions were randomly assigned, by the roll of a die, to scheduled sessions

after the students had self-selected into the session timeslots. To check for initial (i.e.,

pre-task) group equivalencies on Phase I measures, condition assignment in Phase II was

used as the grouping factor in a series of one-way ANOVAs performed on all Phase I

measures. With the single exception of scores on the self-sufficiency subscale of the

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49

In the context of the current study, I am reluctant to use the conventional expression "due to chance," or "expected by chance alone." Perhaps it might be more internally consistent to say the apparent differences were simply "meaningless coincidences" that would be expected to occur from time to time, and read nothing more into them.

50

What springs to mind as one non-meaningless (and admittedly cynical) interpretation of the *particular* pattern of differences are the effects of accumulating education. The most obvious difference between those in the post-only group, as compared to the pre-post group is that the former had experienced 6-8 weeks more university education, which immerses students in a secular world-view (which could conceivably result in reduced transpersonal interpretations along with its logical corollary — decreased death acceptance) as it prepares and equips students for successful living in the adult world (increased levels of exploitiveness).

Narcissistic Personality Inventory (NPI), differences in the distribution of Phase I

measures across conditions were all non-significant. Concerning the single significant

difference on the self-sufficiency subscale of the NPI, a follow up multiple comparison

probe revealed the source of the significance to be associated with a single comparison --

lower scores in the fixed form image-association-only condition (Group 6; $M = 1.95$)

compared to scores in the fixed-form image + writing condition (Group 4; $M = 2.94$),

$t(113) = 3.73, p = .0003$. An examination of the scheduling of sessions showed that,

based literally on the "roll of the dice," Group 4 sessions were all morning sessions (10:30

am), whereas Group 6 sessions were all afternoon sessions (two 2:30 pm sessions and

one 4:00 pm session), thus suggesting a possible "time of day" effect with lower self-

sufficiency scores in the afternoon.[51] However, given that the differences in the

distribution of *total* NPI scores across conditions was non-significant and that the total

NPI score was the measure of interest as a potential covariate in this study rather than any

of its constituent subscales, the minor differences in self-sufficiency in Phase I (between

only two of the groups) were judged as inconsequential and not allowed to overshadow

the fact that all of the other Phase I measures were judged, on the basis of the non-

significant F tests, to be equivalently distributed across conditions.

    <u>Group equivalencies on demographics.</u> A non-significant one-way ANOVA

showed that the groups were not statistically different on age, $F(7, 442) = 1.38, p = .221$.

51

One speculation on the nature of a possible time-of-day effect on self-sufficiency scores might be that as the day wears on in university, students' perceptions of self-sufficiency "fade" with fatigue. Subjectively, it has often been my impression that first-year students who attend afternoon research sessions sometimes appear more "frazzled" and worn-out than students who sign up for morning sessions. Apart from this speculation, the possibility of a real time-of-day effect on the self-sufficiency subscale of the NPI indirectly raises the issue of whether or not this dimension of the NPI can be thought of as unintentionally measuring a temporary state as well as an enduring trait.

The variation in proportion of males and females in each of the groups was also found to be non-significant, $\chi^2(7, N = 443) = 10.47, p = .163$, as was the distribution of marital status, $\chi^2(7, N = 442) = 4.53, p = .716$, and religion, $\chi^2(7, N = 440) = 5.55, p = .592$. For ethnicity, the chi-square value was $\chi^2(7, N = 441) = 13.57, p = .059$.[52]

Check on randomization of images. To verify the randomness of the shuffling and subsequent drawing of the images from the envelope by participants in the image-association conditions, the total number of times each of the 20 images was drawn from the envelopes by all students was recorded from the task record sheets and two analyses performed. First, although there was some nominal variation in the total number of times that each of the images was drawn (e.g, the images of "clown" and "highway" drawn most frequently [$n = 138$], with "clouds" and "rabbit" drawn least frequently [$n = 110$]), a one-way Chi-square[53] showed that this variation was not statistically significant, $\chi^2(19) = 10.94, p = .953$. Table 5 (next page) shows the frequencies and percentages of the total number of times that each of the 20 images was drawn from the envelopes. Second, a one-sample Kolomogorov-Smirnoff test was used to test the uniformity of the distribution. The results show that the distribution of frequencies does not significantly depart from uniformity, K-S $Z = .99$, $p = .281$. Both of these results confirm that the extraction of images from the envelopes by the students in the image-association-conditions approximated random selection.

52

The validity of the χ^2 results for ethnicity are suspect given the small (<5) cell size for non-Caucasian students in the post-only condition.

53

As SPSS cannot easily be used to perform analyses on summary aggregate data, a program designed for this purpose -- Statistics Calculator V 5.0 (StatPac, Inc.) -- was used instead.

Table 5

Distribution of frequencies of total number of times each image was drawn

Image	Total number of times drawn	% of total
Boat	133	.0544
Book	125	.0512
Bucket	131	.0537
Clouds	110	.0457
Clown	138	.0566
Dress	118	.0488
Drum	122	.0500
Gorilla	128	.0525
Highway	138	.0566
House	114	.0467
Lips	116	.0475
Nail	122	.0500
Pen	114	.0468
Phone	117	.0480
Rabbit	110	.0451
Sandal	122	.0500
Skull	125	.0513
Spider	119	.0488
Toilet	114	.0468
Turtle	122	.0500
TOTAL	2,438	

Test for bias due to loss of matchable data. As noted previously, ethical approval

of this research required that data collected across sessions be matched on the basis of a

student-generated "secret code number" rather than name or student number. Although

the intent of this procedural requirement was laudable (i.e., to protect anonymity and

presumably enhance honesty in responding to questionnaire items), a substantial number of

participants forgot their code numbers or recalled them inaccurately, which resulted in

about 20% of the data collected across sessions being "unmatchable" and thus unusable

for any longitudinally-oriented analyses. One possible implication of the loss of these data

might be that it would affect the generalizability of the results. In order to check for any

potential response bias associated with "forgetfulness,"[54] participants were classified as

having either remembered their code numbers (i.e., a "matchable data" group) or as having

forgotten them (i.e., an "unmatchable data" group). Independent t-tests were then

performed to check for any systematic response differences between these two groups on

the independent, dependent, and covariate measures used in the study. Much to my relief,

no statistically significantly differences on any of the measures were found between those

who forgot and those who remembered their code numbers. Additionally, chi-square

analyses showed no significant differences in the distribution of "forgetters" versus

"rememberers" across categories of age, sex, marital status, religion, or ethnicity; or across

the different experimental conditions.

Covariate Selection Tests

As noted previously, stress and narcissism measures were included in the Phase I

battery as potential covariates (CVs). A two-step process was used to assess the

appropriateness of using either or both of these measures as a covariate: First, the

correlations between stress and narcissism and each of the IVs and DVs of the study were

examined. In particular, the examination focussed on identifying correlations with

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54

"Forgetfulness" of code numbers could, for example, conceivably be an indicator of individual differences in memory and retrieval capacity. Because aspects of the study involved a "memory component" -- for example, remembering and reflecting on experiences of chance events and coincidences -- it could be possible that students who forgot their code numbers might answer questionnaire items differently or perform differently on the emplotment task compared to students who remembered their code numbers.

absolute values equal to or greater than $r = .20$.[55]   Table 6 (next page) shows stress and

narcissism correlations for each of the IV and DV measures. Second, homogeneity of

regression tests (of DVs on CVs at each level of dichotomized IV) were then performed on

associations meeting the initial screening criteria.[56]

Stress as a potential covariate. As shown in Table 6, if one disregards sign,

correlations involving stress that are in excess of .20 were found with the full-scale

Chance & Coincidence Questionnaire ($r = .222$) and the Pattern Perception subscale ($r =$

.232); and with Life Attitude Profile measures of Existential Transcendence ($r = -.351$),

Sense of Purpose ($r = -.204$), Choice and Responsibility ($r = -.240$), and Existential

Vacuum ($r = .362$).

Homogeneity of regression tests of the DVs on stress across levels of ambiguity

tolerance showed homogenous slopes on all six DVs of concern (i.e., CCQ total score,

CCQ pattern perception, LAP existential transcendence, sense of purpose, choice and

responsibility, and existential vacuum). Parallel tests across levels of desire for control,

however, showed heterogeneous slopes (i.e., an interaction between control and stress) for

the CCQ total score ($F[1, 477] = 3.92, p = .048$) and for the LAP measure of existential

transcendence ($F[1, 472] = 5.91, p = .015$), making the use of stress as a covariate in

conjunction with desire for control on these two measures inappropriate.

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[55]

Keppel and Zedeck (1989) state that using covariates with correlations of less than .20 with the DV will actually make ANCOVA a less sensitive test of IV effects than a simple ANOVA, and thus, should be avoided.

[56]

The use of covariates in between-groups designs requires that the effects of the covariate on the DV be equivalent across all cells of the design. To check this assumption, the SPSS Manova procedure was used to generate homogeneity of regression tests for the CVs, following the procedures described by Tabachnick & Fidell (2001).

Table 6

Correlations between potential covariates and study IVs & DVs

IV or DV	Stress	Narcissism
IV		
Ambiguity Tolerance	-.265***	.304***
Ambiguity Tolerance dichotomized ("low"/"high")[A]	-.188***	.202***
Desire for Control	-.104***	.495***
Desire for Control dichotomized ("low"/"high")[A]	-.078*	.365***
DV		
Chance & Coincidence Questionnaire (full scale)	.222***	.114*
Transpersonal Interpretation subscale	.158***	.025
Sense of Purpose-in-Chance subscale	.167***	.026
Instrumental Consequences subscale	.144***	.061
Contact & Communication subscale	.189***	.124**
Paranormal Interpretation subscale	.179***	.193***
Perception of Pattern-in-Chance subscale	.232***	.117**
Chance-as-Illusion subscale	.014	-.006
Narrative Emplotment	.119**	.104*
Possible Lives Questionnaire	-.032	.310***
Life Attitude Profile:		
Existential Transcendence (full scale)	-.351***	.154**
Purpose-and-Meaning Index	-.185***	.225***
Sense of Purpose subscale	-.204***	.252***
Sense of Coherence subscale	-.139**	.158**
Choice & Responsibility subscale	-.240***	.238***
Goal-Seeking subscale	.096*	.192***
Existential Vacuum subscale	.362***	-.057
Death Acceptance	-.185***	.030
Persistence Measures:		
Time on task	-.041	-.083
Number of images used	-.085	.054
Number of event elements in story	-.056	.046

[A] Because of hypotheses associated with factorial ANOVA design, the two IVs --
ambiguity tolerance and desire for control -- were dichotomized into "low" and "high"
groups, and Kendall tau-b correlations for ordinal variables also reported in addition to the
regular Pearson *r*.

Narcissism as a potential covariate. As shown in Table 6, if one disregards sign,

correlations involving narcissism that are in excess of .20 were found with scores the

Possible Lives Questionnaire (r = .310), the Purpose and Meaning Index of the LAP (r =

.225), the LAP sense of purpose subscale (r = .252), and the LAP choice and responsibility

subscale (r = .238). As was done with the stress covariate, homogeneity of regression tests

revealed non-significant interactions between ambiguity tolerance and narcissism for

scores on the Possible Lives measure, the LAP Purpose and Meaning Index, sense of

purpose subscale, and choice and responsibility subscale. However, when tested across

levels of desire for control, narcissism significantly interacted with desire for control on

LAP choice and responsibility subscale scores ($F[1, 480] = 5.29, p = .022$), thus

precluding the use of narcissism as a covariate in any between groups analysis involving

this particular LAP subscale.

Concerning the use of covariates correlated with IVs. The traditional "textbook"

warning on the use of covariates in ANCOVA cautions against their use when they are

correlated with the independent measures as well as the dependents (e.g., Hinkel,

Wiersma, & Jurs, 1988; Wildt & Ahtola, 1978). However, this caution against

"confounding" is typically made in reference to the experimental context in which the

independent variable(s) is (are) manipulated by the researcher with a possibility that the

manipulation could affect the covariate, in which case, the recommendation is made that

covariate data be collected prior to the experiment. In the non-experimental case, expert

opinions on the use of covariates differ widely. Because arguments for and against the use

of covariates have been made by experts from both poles of the statistical spectrum with

apparently no consensus likely in the near or even distant future, I have taken a default

approach "somewhere between" conservative statistical purity and liberal utility[57].

Hypotheses 1 through 4 (previously described) are correlational hypotheses. For each of these hypotheses, the analyses were conducted in several steps: First, zero-order correlations were computed, followed by a partial correlation analysis controlling for (a) narcissism, (b) perceived stress, and (c) narcissism *and* stress simultaneously. Second, for significant zero-order relationships involving more-than-negligible variability[58] in the effect sizes as a result of partialling out the potential covariates, simple path analyses were done to determine if either of the covariates mediated the relationship between the IV and DV. Finally, sequential regressions were performed with the covariates entered first to estimate the relative contribution each of the predictors to variability in the DV.

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[57]

At the conservative (theoretically pure) end of the opinion spectrum, the use of covariates that are correlated with the IVs is not even a concern because the *issue itself is logically precluded* by the position that ANCOVA cannot be statistically justified in any design that does not use true random assignment of participants to conditions (Keppel & Zedeck, 1989, p. 481). Noting that few studies ever actually meet the underlying statistical assumptions of ANCOVA, Onwuegbuzie and Daniel (2000) have flatly recommended "that researchers avoid using ANCOVA" (p. 13). At the more pragmatically useful "liberal" end of the spectrum, however, is the position that because "no analysis technique exists that can be blindly applied to all sets of data with foolproof results" (Reichardt, 1979, p. 150), the decision to use or not use covariates in ANOVA designs in any particular study must be made in part on other-than-statistical grounds (e.g., substantive knowledge of the variables in question, considerations of the causal direction of relationships, etc.). Concerning the issue of IV-covariate "non-independence," Tabachnick and Fidell (2001, p. 280) have suggested that the use of ANCOVA in non-experimental research is *entirely appropriate* and that covariate differences in the IV are legitimately corrected for as long as the covariate cannot be thought to be *caused* by the IV. If the use of a covariate that is, on the other hand, *associated* with an IV *reduces* DV differences (the opposite of the researcher's usual aim in using ANCOVA), the authors simply say "so be it" because the unadjusted ANOVA differences would in this case misleadingly reflect differences in the dependent measure that are due to unknown factors other than the IV to begin with (p. 280).

[58]

"More than negligible" here refers to net changes in effect size in the order of greater than +/- .01. Although this value is very small, it sets a liberal criteria that "allows" for a more comprehensive set of analyses than if a higher threshold criteria were chosen, thus increasing the likelihood that if one or both of the covariates did "make a difference" to the primary IV-DV relationship of interest, this difference would have been assessed rather than "passed over" if a more stringent criteria had been adopted.

The fifth hypothesis was framed as an interaction among IVs, and thus, was analysed

through a factorial ANOVA. Parallelling the three-step analytic approach taken with the

first four correlational hypotheses, analysis of the fifth hypothesis was done first *without*

covariates (echoing the "zero-order" correlation step in the previous hypotheses tests).

Then, if two conditions were met for a covariate -- a minimum covariate/DV absolute

correlation of r = .20 in addition to non-violation of homogeneity of regression, then each

analysis was done with each covariate singly and in combination with covariates entered

first (loosely parallelling the partial correlation and sequential regression approach used

with the previous hypotheses tests). In cases in which the homogeneity of regression

assumption was not met, a "blocking" approach was taken by dichotomizing the covariate

and including it as an additional factor in the ANOVA model.

II. Tests of Formal Hypotheses

Hypothesis 1: Desire for Control and Emplotment

Correlational analyses. To test the hypothesis that the desire for control would be

positively correlated with the three measures of emplotment, zero-order Pearson product-

moment (PPM) correlations were computed between the Desirability of Control Scale

scores and scores on (a) the Narrative Emplotment Scale, (b) the Possible Lives

Questionnaire, and (c) the Chance and Coincidence Questionnaire. In addition to this,

partial correlations were also done in which the effects of narcissism, stress, and both

narcissism and stress were controlled (see Table 7 below).

Mediational analyses. To test for any mediational effects of the covariates on the

relationship between Desire for Control and the DV's, simple path analyses were

performed following the procedures outlined by Baron and Kenny (1986).

Table 7

Hypothesis 1: Correlations between DC and three emplotment measures

		partial correlations controlling for		
Desire for Control with	Zero-order	Narcissism	Stress	Narciss. & Stress
Emplotment	.165***	.138**	.178***	.147**
Chance & Coincidence	.047	-.012	.072	.005
Possible Lives	.339***	.224***	.315***	.214***

$* p < .05, ** p < .01, *** p < .001$

As shown in Table 8 and in Figure 1, narcissism was not found to mediate the relationship between desire for control and emplotment given that the path coefficient from desire for control to emplotment only decreased slightly from the second equation (β = .168) to the third equation (β = .159) and the path from narcissism to emplotment was nonsignificant.

Table 8

Mediational analysis: Narcissism as a mediator of DC & Narrative Emplotment Scale scores

Regression		Beta	t	p
1.	Desire for Control ← Narcissism	.494	12.56	< .0001
2.	Desire for Control ← Emplotment	.168	3.08	.0002
3.	Narcissism ← Emplotment	.012	.25	.8041
	Desire for Control ← Emplotment	.159	3.07	.0023

Figure 1

Path diagram: Narcissism as a mediator of DC & Narrative Emplotment Scale scores
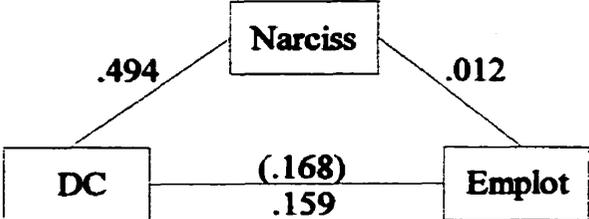
A similar analysis was done to test for mediational affects of narcissism on the

relationship between Desire for Control (DC) and scores on the Possible Lives

Questionnaire (PLQ). As shown in Table 9 and Figure 2 (below), narcissism partially

mediated the effects of desire for control on PLQ scores: When controlled for narcissism,

the strength of the association between DC and PLQ decreased slightly from .323 to .245.

However, the path from DC to PLQ still remained significant.

Table 9

Mediational analysis: Narcissism as a mediator of Desire for Control & PLQ scores

Regression		Beta	t	p
1.	Desire for Control ← Narcissism	.494	12.56	< .0001
2.	Desire for Control ← Possible Lives	.323	7.57	< .0001
3.	Narcissism ← Possible Lives	.191	3 .91	.0001
	Desire for Control ← Possible Lives	.245	5.02	< .0001

Figure 2

Path diagram: Narcissism as a mediator of Desire for Control on PLQ scores
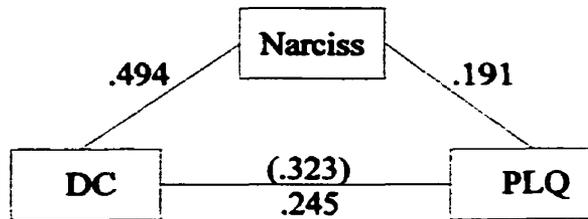
Because the partial correlation analysis also revealed changes when the effects of stress were partialled out in the relationship between Desire for Control and two of the three emplotment measures (i.e., Narrative Emplotment Scale scores and PLQ scores; Table 7), two additional mediation tests were also performed using perceived stress scores as the mediator. First, stress was analyzed as a mediator of the relationship between Desire for Control and Narrative Emplotment Scale scores. Table 10 and Figure 3 below show that stress is not a mediator given that controlling for stress did not reduce the strength of the association between DC and emplotment.

Table 10

Mediational analysis: Stress as a mediator of DC & Emplotment Scale Scores

Regression	Beta	t	p
1. Desire for Control ← Stress	-.10	-2.34	.0197
2. Desire for Control ← Emplotment	.169	3.80	< .0002
3. Stress ← Emplotment	.121	2.74	.0064
Desire for Control ← Emplotment	.179	4.01	< .0001

Figure 3

Path diagram: Stress as a mediator of DC on Narrative Emplotment Scale scores
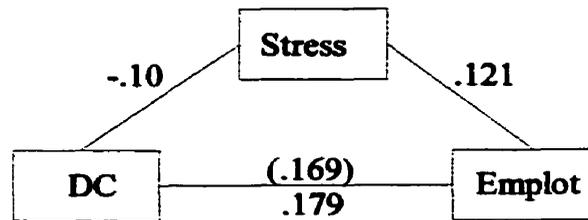
In a second analysis, stress was included as a mediator linking DC and scores on

the PLQ. As shown in Table 11 and Figure 4 (below), stress was not found to have any

mediational effects on the relationship between DC and PLQ scores.

Table 11

Mediational analysis: Stress as a mediator of Desire for Control & PLQ scores

Regression		Beta	t	p
1.	Desire for Control ← Stress	-.10	-2.34	.0197
2.	Desire for Control ← PLQ	.323	7.57	< .0001
3.	Stress ← PLQ	-.034	-0.79	.4280
	Desire for Control ← Emplotment	.316	7.35	< .0001

Figure 4

Path diagram: Stress as a mediator of Desire for Control on PLQ scores
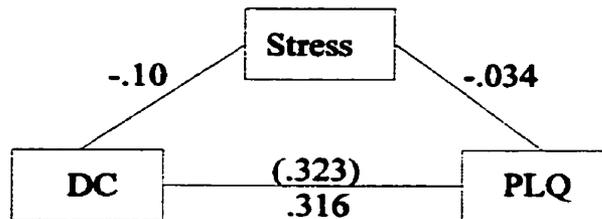
Sequential regressions. Sequential regressions (with covariates entered first) were

conducted for each hypothesized relationship. The results are presented in Table 12.

Table 12

Sequential regressions for hypothesis 1.

DV	Cov/IV	Step 1			Step 2		
		β	t	p	β	t	p
Emplotment	Stress	.106	2.35	.019	.121	2.68	.008
	Narcissism	.093	2.05	.041	.008	0.17	.865
	DC	-	-	-	.169	3.25	.001
		Multiple R = .140			Multiple R = .202		
CCQ	Stress	.220	4.89	.001	.221	4.87	.001
	Narcissism	.117	2.59	.010	.113	2.17	.030
	DC	-	-	-	.006	0.12	.903
		Multiple R = .248			Multiple R = .248		
Possible Lives	Stress	-.064	-1.48	.138	-.045	-1.05	.295
	Narcissism	.313	7.19	<.001	.196	4.01	.001
	DC	-	-	-	.235	4.78	.001
		Multiple R = .319			Multiple R = .378		

Discussion of results for hypothesis 1. The first hypothesis predicted that Desire

for Control (DC) would positively correlate with scores on the Narrative Emplotment

scale (NES), the Possible Lives Questionnaire (PLQ), and the Chance and Coincidence

Questionnaire (CCQ). This prediction was partially confirmed: DC was significantly

correlated with both NES and PLQ, but not CCQ scores. Further, this pattern of

relationships held after partialling out the effects of narcissism and stress.

Mediational analyses revealed only one structurally meaningful covariate effect that

bears further discussion. It was found that narcissism partially mediated the relationship

between DC and scores on the Possible Lives Questionnaire. How might this be

conceptually understood? One possibility is first to consider two broad conceptions of

narcissism, and then consider these in light of what the Possible Life Questionnaire

measures. One conception of narcissism is that it in part reflects what might be thought of

as an optimistic, self-protective, and motivationally adaptive evaluation of one's abilities

or capacities (e.g., Hickman, Watson, & Morris, 1996). The alternate conception casts

narcissism in more extreme terms as a "disorder" of self-perception characterized by "a

grandiose sense of self-importance....exaggerate[d] achievements and talents....

preoccupied with fantasies of unlimited success [and] power" (American Psychiatric

Association, Diagnostic and statistical manual of mental disorders [3rd ed. revised], 1987,

p. 351). Consider these two conceptions in terms of the Possible Lives Questionnaire

(PLQ), which is a measure of emplotment of the future, and was developed as a multi-

dimensional measure to evaluate the breadth of possible futures that the respondent could

envision. This breadth of possible futures in the PLQ includes both "good" and "bad"

futures. Because of this multidimensionality, it may be useful to look at each item of the

PLQ from a univariate perspective. Table 13 (below) shows the correlations between

scores on the NPI and each of the eight items of the PLQ, along with correlations of each

item with Desire for Control.

Table 13

Correlations between NPI and 8 individual items of the Possible Lives Questionnaire

PLQ Item	Correlations with	
	NPI	DC
1. getting married	.124**	.142**
2. becoming an alcoholic or drug abuser	.188***	-.020
3. getting a good paying job soon after graduating	.188***	.211***
4. getting killed in an accident	.036	.042
5. becoming actively involved in social & political movements	.279***	.341***
6. leading a life of travel and adventure in foreign lands	.173***	.179***
7. becoming a small business owner, making a decent living	.188***	.270***
8. making religion the centre of your life	-.055	-.050

$* p < .05, ** p < .01, *** p < .001$

As can be seen from Table 13, NPI scores positively correlate with 6 of the 8 PLQ

"possible lives," but most notably with what might be considered the most "grandiose"

possibility -- involvement in social and political movements. However, at what "level"

does an optimistic personal efficacy belief about an outcome that *has not yet occurred*

become "grandiose"? It would seem to me that a judgement of whether or not a

reasonable belief was grandiose could only be made after-the-fact. Apart from the logical

problem of making prejudgements of grandiosity, the application of a grandiosity

conception of narcissism to these results is made even more difficult by noting the fact that

NPI also positively correlated with the PLQ possibility of "becoming an alcoholic or drug

abuser," which to the current author does not sound like a very "grandiose" or self-enhancing possibility at all. Further, it is interesting to note from the parallel pattern of correlations of NPI and DC with the PLQ items, that the "alcoholic or drug abuser" possibility was the only item that did *not* correlate with DC but *did with NPI*. This is particularly interesting in view of some of the earlier work by Raskin (and Hall) to establish the construct validity of the NPI in which the author(s) reported shared characteristics between NPI and creativity (Raskin, 1980; Raskin & Hall, 1981). On this basis, the link between narcissism and scores on both "good" and "bad" possible future items in the PLQ can, I maintain, be better understood from a "creativity" perspective than a "grandiose self-enhancement" perspective. As maintained throughout this study, emplotment is constituted by the essential act of the *creation* of meaning. The PLQ asks individuals to imagine what they could see as reasonable possibilities in their futures, and as such, can be considered as much a measure that reflects creativity and realism (which could envision the "bad" as well and the "good") as it does optimism or self-enhancement (which presumably would envision only the "good"). The finding that NPI correlates with the "bad" (becoming an alcoholic or drug abuser) as well as the "good" PLQ possibilities supports the former conception of the NPI-PLQ linkage as reflecting the creative aspect of narcissism rather than the self-enhancing or self-inflating aspect.

Additional evidence that leads further away from the self-enhancement conception of narcissism can also be found in noting that NPI scores did not correlate with the transpersonal interpretation subscale of the CCQ (see Table 6). Several writers in transpersonal psychology (e.g., Epstein, 1990; Welwood, 1984) have noted that processes and practices of spiritual development (e.g., mediation, conscious awareness exercises,

etc.) can often be arrested by narcissistic fascination and ego-inflation. As noted

previously, many people experience chance events and coincidences as supernatural

interventions (e.g., from God, fate, etc.), and thus, could be construed as instances of ego-

inflation; perhaps characterized as akin to a "cosmic egocentricity" in which God or fate

had taken special effort to arrange circumstances solely for the benefit of the individual.

In his original discussion of narcissism, Freud (1914/1948) spoke of "delusions of

observation, or more correctly, of *being watched*" (p. 52, italics in original), and in the

DSM-III-R (American Psychiatric Association, 1987) one of described characteristics of

schizophrenia are "delusions of reference, in which events, objects, or other people are

given special or unusual significance" (p. 188). In combination with the DSM-III-R

criteria for narcissistic personality disorder that include expectations of being "noticed as

special" and of "especially favorable treatment," these three characteristics -- delusions of

being watched, giving special or unusual significance to events, and expectations of

favourable treatment -- together suggest that transpersonal interpretations of chance

events and coincidences would qualify as indicators of an underlying psychopathology and

as such would be expected to correlate with the NPI. But they do not.

Table 14 (below) shows the correlations between NPI and each of the items in the

CCQ transpersonal interpretation subscale (DC correlations are also provided). The

complete lack of association of NPI scores with any of the CCQ items related to

transpersonal interpretations of chance events I believe underscores the suggestion that, at

least in the current study, the role of narcissism in relation to emplotment is not one of

self-enhancement, but rather of creativity in the construction of meaning.

Table 14

Correlations of NPI with CCQ Transpersonal Interpretation subscale items.

| | Correlations with | |
CCQ Transpersonal Item	NPI	DC
3. I have had experiences of chance and coincidences that left me with the feeling that God or some higher power had something to do with it.	.030	-.024
6. Chance events and coincidences in my life have resulted in me having a more spiritual or religious outlook on life.	.052	.027
15. When a chance event or encounter suggests an answer to a personal question or difficulty, I believe that a divine intelligence provides this guidance.	-.020	-.067
16. My experiences of meaningful coincidences have given me a sense that a divine being is looking after me.	-.005	-.037
21. Chance events have allowed me to experience greater spiritual feelings in my life.	.049	.092*

*$p < .05$

Although the hypotheses did not specify an examination of the CCQ transpersonal subscale, I believe that these post-hoc observations help in understanding the broader role of narcissism as a covariate in the hypothesized relationships between Desire for Control and emplotment. The sequential regressions using both covariates showed that when desire for control was entered into the model in step 2 for Narrative Emplotment Scale scores, the contribution of narcissism to emplotment became very small and statistically insignificant. In the model using Possible Life Questionnaire scores, the entry of Desire for Control in step 2 attenuated the contribution of narcissism but did not statistically eliminate it. One very obvious difference between the NES and the PLQ is that the NES is

very specifically a measure of the retrospective emplotment of chance and unchosen events, whereas the PLQ is a measure of prospective emplotment of events which are potentially under intentional control. Past events, as in the NES, which cannot be objectively altered, cannot be subject to motivated action that would presumably arise from optimistic self-expectations inherent in narcissism. On the other hand, with PLQ future possibilities, in which intention can still play a role, creative and optimistic self-efficacy beliefs would support the desire for control in the emplotment of the future. This is what the analyses suggest. More important in terms of the original hypothesis, what both the emplotment of the past (NES) and the emplotment of the future (PLQ) have in common is the desire for control.

Hypothesis 2: Desire for Control, Personal Meaning, and Emplotment Persistence

Hypothesis 2 predicted that desire for control would be positively associated with (a) existential well-being as measured by the Personal Meaning Index of the Life Attitude Profile, (b) persistence with an emplotment task as measured the time spent by the participants on the task,[59] and (c) depending on the experimental condition, the number of image associations made and/or number of events [60] described in their coincidence stories.

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[59]

Because different experimental groups had different task combinations, time-on-task analyses of the raw data across all groups was not possible because some task combinations could inherently take more time to complete (i.e., those doing both tasks rather than just one). To make the time-on-task measure comparable across conditions, "raw" time-on-task scores (measured in 5-minute blocks) were standardized (converted to z-scores) *within* each condition before the analyses were done.

[60]

In a pilot study, the number of events was evaluated by the researcher and a volunteer assistant. Although this method produced good "inter-rater reliability," it was inefficient, exceedingly time-consuming, and produced a variable that did not correlate with other measures. After the pilot, the decision was made to let the participants "speak for themselves," and an item was added to the post-task questionnaire that simply asked each participant to state how many events were in the story.

Correlational analyses. As shown in Table 15 below, the first part of the

hypothesis was confirmed: Desire for Control (DC) was found to be significantly and

positively associated with scores on the Personal Meaning Index (PMI) of the Life

Attitude Profile. The second part of the hypothesis was not confirmed: The zero-order

correlation between DC and time on task was not significant. However, when the effects

of narcissism, or narcissism and stress together, were partialled out of the relationship, the

correlation between DC and time-on-task increased to a level that was significant at $p <$

.05. Finally, the third part of the hypothesis was clearly not confirmed. None of the zero-

order or partial correlations between DC and either the number of matched images or the

number of story events was significant.

Table 15

Hypothesis 2: Correlations between DC and Personal Meaning Index (PMI) and
emplotment task persistence

Desire for Control with	Zero-order	partial correlations controlling for		
		Narcissism	Stress	Narciss. & Stress
Personal Meaning Index	.324***	.256***	.315***	.240***
Time on task	.064	.125*	.062	.124*
Number of matched images	.096	.075	.074	.049
Number of events in stories	-.024	-.065	-.046	.086

$* p < .05, ** p < .01, *** p < .001$

Mediational analyses. Because narcissism positively correlated with PMI scores r

$= .225, p < .001$; from Table 6), and controlling for it reduced the size of the association

between DC and PMI, a path analysis of this tri-variate relationship was done to determine

if narcissism mediated the relationship between DC and PMI. Results of the regressions

are shown below in Table 16 and Figure 5. The non-significant path from narcissism to

PMI in the third regression shows that narcissism failed to function as a mediator of the

effects of Desire for Control on Personal Meaning Index scores.

Table 16

Mediational analysis: Narcissism as a mediator of Desire for Control & PMI scores

Regression	Beta	t	p
1. Desire for Control ← Narcissism	.495	12.59	<.0001
2. Desire for Control ← PMI	.332	7.77	<.0001
3. Narcissism ← PMI	.079	1.48	.1386
Desire for Control ← PMI	.288	5.78	<.0001

Figure 5

Path diagram: Narcissism as a mediator of Desire for Control on PMI scores
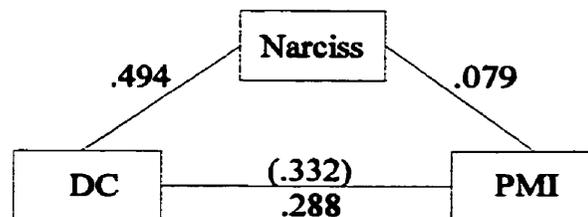
A similar analysis was done to test for the mediational effects of stress. The results

are shown below in Table 17 and Figure 6. The results (significant paths in all regressions

and a slight decrease in the path from DC to PMI in the third regression) indicate that

stress partially mediates the relationship between DC and PMI scores. Although the

effects are small, higher desire for control is associated with slight reductions in stress,

which in turn contribute to slight elevations in PMI scores.

Table 17

Mediational analysis: Stress as a mediator of Desire for Control & PMI scores

Regression	Beta	t	p
1. Desire for Control ← Stress	-.104	-2.34	<.0197
2. Desire for Control ← PMI	.332	7.77	<.0001
3. Stress ← PMI	-.154	-3.61	.0003
Desire for Control ← PMI	.312	7.34	<.0001

Figure 6

Path diagram: Stress as a mediator of Desire for Control on PMI scores
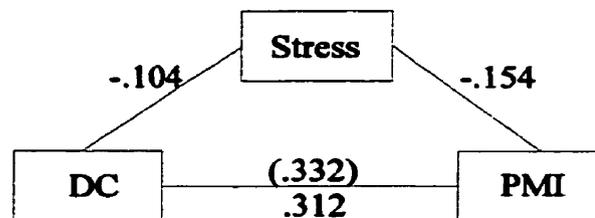
Sequential regressions. A sequential regression (with covariates entered first) was

run for PMI on Desire for Control. In addition to this, a second sequential regression was

run for standardized time-on-task scores on DC because of the finding that partialling out

the effects of narcissism and stress resulted in a small but significant positive correlation

between DC and time-on-task (see Table 15). Results of the regressions are presented in

Table 18 (below).

In the first regression (PMI on DC), both covariates were significant predictors of

PMI scores in Step 1 in the absence of desire for control. However, when DC was

entered into the model in Step 2, narcissism became non-significant, leaving only stress

and DC as significant predictors of PMI scores.

Table 18

Sequential regressions for hypothesis 2

DV	Cov/IV	Step 1			Step 2		
		β	t	p	β	t	p
PMI	Stress	-.172	-3.89	<.001	-.149	-3.45	.001
	Narcissism	.213	4.82	<.001	.081	1.64	.102
	DC	-	-	-	.267	5.37	<.001
		Multiple R = .276			Multiple R = .360		
Time on Task	Stress	-.052	-0.95	.345	-.035	-0.63	.531
	Narcissism	-.086	-1.56	.119	-.159	-2.51	.013
	DC	-	-	-	.145	2.26	.024
		Multiple R = .099			Multiple R = .158		

In the second sequential regression, neither stress nor narcissism significantly

predicted time-on-task in Step 1. However, when DC was entered at step 2, β's for both

narcissism and DC were found to be significant. Although the combined effect size of all

three predictors is small ($r = .158$), and in practical terms accounts for only about 2.5% of

the variability of time spent on the emplotment task, it is a significant model of theoretical

interest (see discussion of results for hypothesis 2, below).

Discussion of results for hypothesis 2. As predicted, Desire for Control (DC) was

positively associated with scores on the Personal Meaning Index of the LAP. This result

adds further support to the conception that DC is a motivational variable that is not

restricted to the world of objective external events (i.e., "primary control"), but as well has

an organizing function in the world of subjective meaning that is not unlike that of

Rothbaum et al.'s (1982) conception of "secondary interpretive control."

Reker (1996) describes personal meaning as "having life goals, having a mission in

life, having a sense of direction from the past, present, and future, and having a logically

integrated and consistent understanding of self, others, and life in general" (p. 20). These

characteristics can equally be considered as essential elements of a coherent narrative self-

identity. Of particular relevance on this point is the phrase "sense of direction from the

past, present, and future" in Reker's definition. Recall from the hypothesis 1 analyses that

DC was positively associated with both the PLQ (a measure of envisioning future

possibilities) and the NES (a measure of the emplotment of past unchosen events,

including chance events). I would like to focus for a moment on the latter. The past

cannot be controlled, only interpreted; and this, so to speak, "demand characteristic" is

particularly salient for events over which control was not objectively possible (i.e., chance

events). Without an interpretation, the past cannot provide or enhance, in Reker's terms,

a "sense of direction," but rather would erode this possibility, and, consistent with

Ricouer's (1992) conception of emplotment, would threaten the coherence of the "plot" of

one's narrative self-identity across time. In this context, an extended conception of desire

for control can be understood to include a motivational predisposition to "reach back" into

time and reshape the meanings of events to give them continuity with the present.

The second part of hypothesis 2 predicted positive correlations of DC on persistence in an emplotment task in which persistence was defined as spending more time on the task, making more associations between personal memories and randomly selected images, or including more events in descriptions of experiences of coincidences. Although the zero-order correlations between DC and these three measures of persistence measures were small and non-significant, the partialling out of narcissism *increased and made significant* the correlation between DC and time-on-task (see Table 15) . In the sequential regression, the presence of DC *increased and made significant* the β weight of narcissism. These results suggest a reciprocal suppression effect in which DC enhances the importance of narcissism and vice versa, yet neither variable alone appears to be appreciably associated with the DV.[61] The nature of this relationship is open to speculation. The zero-order correlation between narcissism and time-on-task was $r = -.086$, and was non-significant. Apart from the non-significance, the direction of the effect suggests or hints at an inverse relationship in which more narcissistic individuals would spend less time completing the emplotment task that those with lower levels of narcissism. Does this make sense? Yes, I think it does. It could be argued that "narcissists," by virtue of their increased proclivity to think about themselves or put themselves at the centers of their own universes could in a sense be thought of as having

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[61]

In this situation, the usual straight-forward way of interpreting the results of the regression (i.e., looking at the relative contribution of each variable in the model) becomes difficult because the suppressor is not defined by its own regression weight but by the enhancement it has on the weights of the other IVs (by "suppressing" irrelevant nonerror variance) and that no test has yet been devised to assess the statistical significance of the enhancement. Instead, the recommendation is made that the interpretation of the results be done by comparing regression weights to the pattern of correlations among the variables and focussing on the context or situation in which the suppression effect occurs (Tabachnick & Fidell, 2001).

simply had *more practice* at making events in the external world self-relevant. As with

most things, the more practice we have at a task, the more quickly or efficiently we

perform it. Thus, when placed in a situation in which they are asked to link random

images to personal memories or write about their experiences of meaningful coincidence,

they would be able to do this slightly faster than individuals for whom a "narcissistic" way

of thinking about the self-world identity is less familiar. As noted, however, the zero-order

correlation was not significant, nor was the β weight in the first step of the sequential

regression. However, when DC was entered into the model in Step 2, the β weight of

narcissism was enhanced from a non-significant $r = -.089$ to a significant $\beta = -.159$ ($p =$

.013), suggesting that DC may have in effect made narcissism a "better measure" in this

model by removing some irrelevant variance[62] in the NPI.

From the "other direction," consider the contextual meaning of the zero-order

correlation between DC and time-on-task. Although non-significant ($r = .064$), the

direction suggests that individuals scoring higher on DC spent slightly more time on the

emplotment task than those with lower DC scores. Does this make conceptual sense?

Again, yes it does, for it could be argued that when faced with a challenging task,

individuals with higher levels of desire for control would persist at the task and not give

up as easily (which in the context of the experimental phase of this research they were

completely free to do). Burger (1992) reports that this is in fact the case from his own

research in which he found that high desire for control students spent more time and effort

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62

Irrelevant variance is not the same as error variance. According to Conger (1974), irrelevant variance is *non*error variance in the predictor which is unrelated to the DV, but which is related to one or more other predictors.

on a series of impossible puzzle solving tasks than low desire for control students, even

though they could skip each puzzle if they found it too difficult. He also notes that in the

debriefing, after telling the students that the puzzles were unsolvable, that high desire for

control students told him that it never even occurred to them that the puzzles might be

unsolvable.

In the current study, desire for control was non-significantly correlated (although

in the expected direction) with time-on-task. However, this non-significant correlation (r

= .064) "jumped" to a significant β of .145 (p = .024) in step 2 of the sequential regression

after the effects of narcissism on time-on-task had been removed in step 1. So perhaps, by

"controlling for" the time-efficiency in the task due to the "practice effects" which

narcissists may have in self-referencing, the time-*inefficiency* of desire for control was

more directly or "purely" measured, and thus more apparent. In a manner of speaking, the

inclusion of narcissism in the model in effect may have made DC a "better measure" than it

would have been on its own. It is interesting that DC and narcissism (NPI) are

themselves positively correlated (r = .495, p < .001), and suggests perhaps in this instance

at least that the (partial) "confounding" of these two variables leads to better results than if

the variables had been unconfounded. Additionally, it also points to a more complex (and

perhaps non-linear) dynamic in the relationship between narcissism and desire for control.

This latter speculation is beyond the scope of this study, but could be the focus of future

research.

Because the third part of hypothesis 2 which predicted a positive correlation

between DC and either number of matched images or number of story events was not

confirmed (even when controlling for narcissism and/or stress), no further analyses (i.e.,

mediational analyses or regressions) were done using these variables. Nonetheless, a speculative comment should be made concerning the lack of association of these measures to DC. First, concerning the number of match images, the direction of the correlation was as hypothesized (i.e., positive), but was small and non-significant ($r = .096$, exact 1-tailed $p = .076$). This result is based on data from a subset of the sample who did the image-association task ($n = 245$). A power analysis[63] showed that at this n size, power was only about .45. Over twice as many participants ($n = 616$) would have been needed to attain a more reasonable power (i.e., .80) and to claim that a correlation as small as the one found was significant. Thus, it may not be that the theoretical basis for this part of the hypothesis was wrong, but that rather the design of the study did not allow for a conclusive test of the hypothesis. One consideration in this respect is the task itself. Students were asked to attempt to make 10 image-memory associations. An examination of the data showed that most students were able to do this task fairly well and the data was somewhat negatively skewed. For example, only three students (0.8%) were unable to make more than two associations, whereas 45 students (18.4%) were able to make nine or more associations. Perhaps if the task had been made more challenging, such as by requiring the attempt to associate 20 images rather than 10, there would have been more variability in the results which may have parallelled the variability in DC.

Concerning the (lack of) significant association between DC and number of story events, power was dismal (.10), and the correlation only slightly improved after controlling for stress and narcissism (.38). In this case, however, the skew of the data was

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[63]

Power analysis was computed using an older (1988) DOS utility program called "Power," authored by Michael Borenstein and Jacob Cohen and published by Erlbaum & Associates.

positive and kurtosis more extreme than was the case for the number of image-memory associations. Most students (59.6%) who did the writing task identified no more than three events in their coincidence stories. One possible reason for this is that despite what the researcher believed to be fairly clear instructions to the students to state how many separate events comprised their coincidences, students focussed on only the most obvious or proximal events and disregarded the more distal events in the chain of occurrences leading up to the coincidence. This is only speculation however. Just as the image-association task may have been insufficiently challenging to "activate" desire for control, so too the writing task. And just as increasing the image task requirement to 20 images rather than 10 may have increased variability in the scores, increasing the challenge and complexity of the narrative task may have had a similar effect. Although hindsight is "20/20," it might, for example, have been useful to have students focus more on the chain of events leading up to the coincidence rather that the coincidence itself, possibly by mapping out a diagram or flow-chart, or by engaging in several counterfactual "what-if" narratives of the same coincidence altering one or more events in the chain each time. By making the task more challenging, in this or other ways, a greater range of scores might have been produced, and the task may have been one in which the desire for control may have been more relevant and discernable.

Hypothesis 3: Ambiguity Tolerance and Paranormal/Transpersonal Experience, Desire for Control, Emplotment, and Personal Meaning

Hypothesis 3 consists of four sub-hypotheses in which tolerance of ambiguity is expected to inversely correlate with (a) scores on the transpersonal and paranormal interpretation sub-scales of the Chance and Coincidence Questionnaire, (b) scores on the

Desire for Control scale, (c) scores on the Narrative Emplotment Scale, and (d) scores on

the Personal Meaning Index of the LAP.

Correlational analyses. As shown in Table 19 (below), none of the sub-hypotheses

of hypothesis 3 were confirmed; and in fact, most were found to be exactly opposite of

what was expected in that ambiguity tolerance was *positively* correlated with four or the

five DVs associated with the hypothesis.

Table 19

Hypothesis 3: Correlations between ambiguity tolerance and CCQ paranormal &
transpersonal subscales, Desire for Control, Narrative Emplotment and Personal Meaning
Index (PMI)

		partial correlations controlling for		
ambiguity tolerance with	Zero-order	Narcissism	Stress	Narciss. & Stress
CCQ paranormal exp.	.214***	.163***	.274***	.218***
CCQ transpersonal exp.	-.034	-.043	.013	.004
Desire for Control (DC)	.494***	.362***	.441***	.348***
Narr. Emplot. (NES)	.162***	.135**	.198***	.167***
Personal Meaning Index	.246***	.191***	.206***	.141**

* $p < .05$, ** $p < .01$, *** $p < .001$

Mediational analyses. Because the pattern of partial correlations (Table 19)

suggests mediation effects for both covariates, mediation tests were computed for each

IV-CV relationship on the paranormal subscale of the Chance and Coincidence

Questionnaire (CCQ_para), Desire for Control (DC), Narrative Emplotment (NES), and

the Personal Meaning Index (PMI).

Results of the regression analyses testing for the mediational effects of narcissism

on the relationship between ambiguity tolerance (MSTAT) and the paranormal subscale of

the Chance and Coincidence Questionnaire are shown below in Table 20 and Figure 7.

Table 20

Mediational analysis: Narcissism as a mediator of ambiguity tolerance & paranormal
interpretation

Regression	Beta	t	p
1. Ambiguity tolerance ← Narcissism	.304	6.99	< .0001
2. Ambiguity tolerance ← CCQ_para	.219	4.98	< .0001
3. Narcissism ← CCQ_para	.156	3.36	.0010
Ambiguity tolerance ← CCQ_para	.167	3.60	< .0001

Figure 7

Path diagram: Narcissism as a mediator of ambiguity tolerance on CCQ-para scores
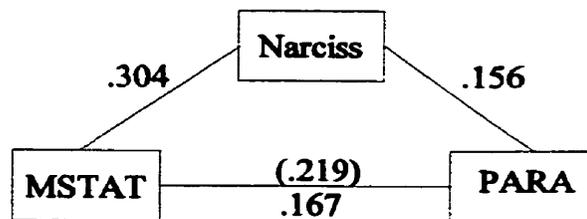
Narcissism partially mediated the relationship between ambiguity tolerance and

paranormal interpretations of coincidence as shown by significant relationships in all

regressions and a slight decrease in the path from ambiguity tolerance to paranormal

interpretation in the third regression.

The same analysis was run to test for any mediational effects of stress. Results are

shown below in Table 21 and Figure 8.

Table 21

Mediational analysis: Stress as a mediator of ambiguity tolerance & paranormal interpretation

Regression	Beta	t	p
1. Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2. Ambiguity tolerance ← CCQ_para	.219	4.98	< .0001
3. Stress ← CCQ_para	.245	5.53	< .0001
Ambiguity tolerance ← CCQ_para	.280	6.30	< .0001

Figure 8

Path diagram: Stress as a mediator of ambiguity tolerance on CCQ-para scores
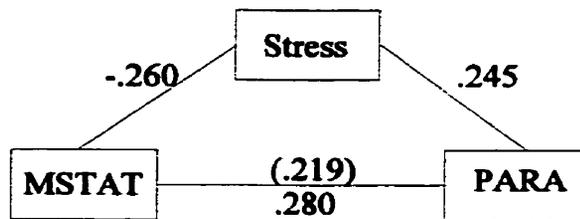
All paths in the regressions were significant, but rather than mediation, the results suggest that the "removal" of the effects of stress strengthens the relationship between MSTAT and paranormal interpretations of chance. To check for differential effects of stress, MSTAT and stress were dichotomized and used in a 2 by 2 ANOVA with paranormal interpretation as the DV. Although the interaction was not significant ($F[1, 487] = 2.74$, $p = .099$), the pattern of means suggest lower paranormal interpretations in the low stress/low MSTAT group. Tukey HSD tests show non-significant differences in high MSTAT participants ($M = 23.56$ for low stress vs. $M = 24.85$ for high stress), but

significantly lower paranormal interpretations in low stress/low-MSTAT participants

compared to high stress/low MSTAT participants (respective means = 19.94 vs. 23.17,

$t[247] = -3.99, p < .0001$).

Regression analyses were also used to test for any mediational effects of narcissism

on the association between ambiguity tolerance and desire for control. Results are

presented below in Table 22 and Figure 9.

Table 22

Mediational analysis: Narcissism as a mediator of ambiguity tolerance & desire for control

Regression		Beta	*t*	*p*
1.	Ambiguity tolerance ← Narcissism	.304	6.99	< .0001
2.	Ambiguity tolerance ← DC	.452	11.12	< .0001
3.	Narcissism ← DC	.396	10.04	< .0001
	Ambiguity tolerance ← DC	.330	8.40	< .0001

Figure 9

Path diagram: Narcissism as a mediator of ambiguity tolerance on desire for control
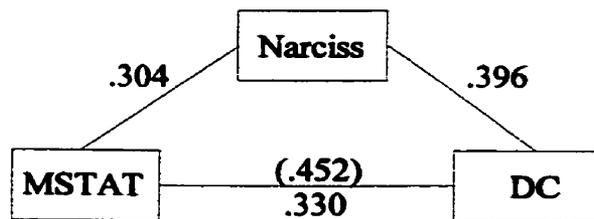
The results clearly reveal the substantial effect of narcissism in partially mediating the relationship between ambiguity tolerance and desire for control as shown by fairly large decrease in the magnitude of the path coefficient from MSTAT to DC when narcissism was included in the model as a covariate predictor.

To test for possible mediational effects of stress in the same model, three more regressions were run. The results of these regressions are presented below in Table 23 and Figure 10.

Table 23

Mediational analysis: Stress as a mediator of ambiguity tolerance & desire for control

Regression		Beta	t	p
1.	Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2.	Ambiguity tolerance ← DC	.452	11.12	< .0001
3.	Stress ← DC	.025	0.59	.5540
	Ambiguity tolerance ← DC	.457	10.76	< .0001

Figure 10

Path diagram: Stress as a mediator of ambiguity tolerance on desire for control
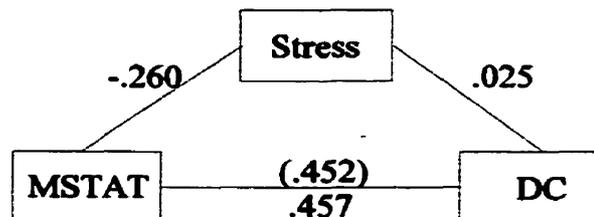
Stress failed to function as a mediator of the association between ambiguity tolerance and desire for control. Although significantly associated with ambiguity tolerance, it was unassociated with DC; and its inclusion in the model did not make any substantial difference in the strength of the relationship between MSTAT and DC.

Regressions were then performed to test for any mediating effects of narcissism on the relationship between ambiguity tolerance and scores on the Narrative Emplotment Scale (NES). The results are presented below in Table 24 and Figure 11.

Table 24

Mediational analysis: Narcissism as a mediator of ambiguity tolerance & emplotment scores

Regression	Beta	t	p
1. Ambiguity tolerance ← Narcissism	.304	6.99	< .0001
2. Ambiguity tolerance ← Emplotment	.167	3.74	< .0001
3. Narcissism ← Emplotment	.067	1.41	.1580
Ambiguity tolerance ← Emplotment	.141	2.97	.0030

Figure 11

Path diagram: Narcissism as a mediator of ambiguity tolerance on emplotment scores
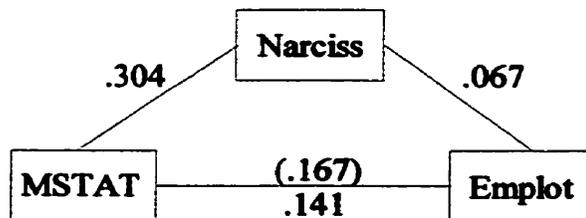
The non-significant path from narcissism to emplotment precludes its role as a

mediator of the association between ambiguity tolerance and emplotment. To test for any

mediation of stress on the relationship between ambiguity tolerance and emplotment, three

more regressions were run using stress as the covariate. The results of these regressions

are presented below in Table 25 and Figure 12.

Table 25

Mediational analysis: Stress as a mediator of ambiguity tolerance & emplotment

Regression	Beta	t	p
1. Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2. Ambiguity tolerance ← Emplotment	.167	3.74	< .0001
3. Stress ← Emplotment	.166	3.61	< .0001
Ambiguity tolerance ← Emplotment	.204	4.40	< .0001

Figure 12

Path diagram: Stress as a mediator of ambiguity tolerance on emplotment
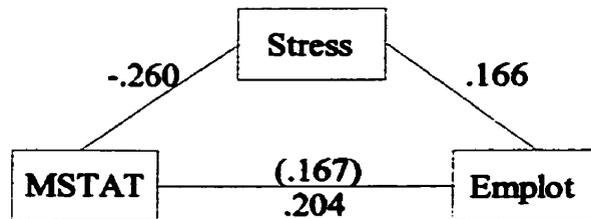
Results show a similar non-mediational pattern to those found in the examination

of stress, ambiguity tolerance, and paranormal interpretation. To check for differential

effects of stress, a 2 (low vs. high stress) by 2 (low vs. high MSTAT) ANOVA was done

on emplotment. The interaction was marginally significant, $F(1, 482) = 3.27, p = .071$.

Tukey HSD pairwise tests showed decreased emplotment scores *only* for low stress/low

ambiguity-tolerant participants ($M = 34.47$ for low stress/low MSTAT vs. $M = 37.64$ for

high stress/low MSTAT, $t(244) = -3.06, p = .0024$). For high ambiguity tolerant

participants, the emplotment score differences across levels of stress were nonsignificant

($M = 38.18$ for low stress vs. $M = 38.64$ for high stress).

Three additional regressions were then run to test for any mediating effects of

narcissism on the relationship between ambiguity tolerance and scores on the Personal

Meaning Index (PMI). The results are presented below in Table 26 and Figure 13.

Table 26

Mediational analysis: Narcissism as a mediator of ambiguity tolerance & PMI scores

Regression	Beta	*t*	*p*
1. Ambiguity tolerance ← Narcissism	.304	6.99	< .0001
2. Ambiguity tolerance ← PMI	.254	5.76	< .0001
3. Narcissism ← PMI	.166	3.59	< .0001
Ambiguity tolerance ← PMI	.195	4.22	< .0001

Figure 13

Path diagram: Narcissism as a mediator of ambiguity tolerance on PMI scores
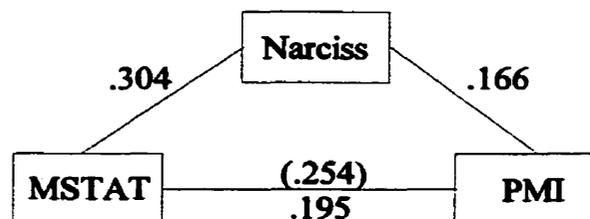
As shown in the results above, narcissism was found to partially mediate the effect

of ambiguity tolerance on scores of the Personal Meaning Index (PMI). All paths in the

model remained significant, and there was a slight decrease in the path from MSTAT to

PMI when narcissism was entered into the model in the third regression.

Finally, three more regressions were run to test for any mediation effects of stress

in the relationship between ambiguity tolerance and scores on the Personal Meaning Index.

The results of these regressions are presented below in Table 27 and Figure 14.

Table 27

Mediational analysis: Stress as a mediator of ambiguity tolerance & PMI scores

Regression	Beta	t	p
1. Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2. Ambiguity tolerance ← PMI	.254	5.76	< .0001
3. Stress ← PMI	-.140	-3.07	< .0020
Ambiguity tolerance ← PMI	.210	4.60	< .0001

Figure 14

Path diagram: Stress as a mediator of ambiguity tolerance on PMI scores
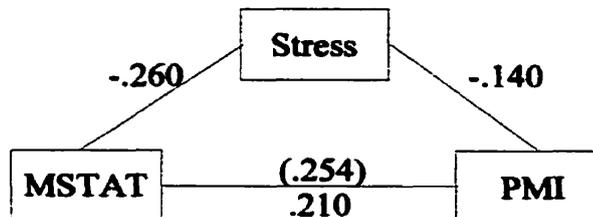
The results show that stress partially mediated the effect of ambiguity tolerance on

Personal Meaning Index (PMI) scores. All paths were significant, and the path coefficient

between MSTAT and PMI decreased when stress was added into the third regression.

Sequential regressions. Sequential regressions (with covariates entered first) were

run for all of the models for which mediational analyses had been done in hypothesis 3.

The results are presented below in Table 28.

Table 28

Sequential regressions for hypothesis 3.

DV	Cov/IV	Step 1			Step 2		
		β	t	p	β	t	p
CCQ-paranormal	Stress	.176	3.98	<.001	.234	5.22	<.001
	Narcissism	.207	4.69	<.001	.138	3.04	.002
	Ambiguity	-	-	-	.229	4.87	<.001
		Multiple R = .271			Multiple R = .343		
Desire for Control	Stress	-.085	-2.11	.035	.005	1.25	.901
	Narcissism	.494	12.33	<.001	.397	10.05	<.001
	Ambiguity	-	-	-	.329	8.01	<.001
		Multiple R = .502			Multiple R = .585		
Emplotment	Stress	.115	2.53	.012	.161	3.46	.001
	Narcissism	.110	2.41	.017	.055	1.17	.242
	Ambiguity	-	-	-	.180	3.68	<.001
		Multiple R = .159			Multiple R = .229		
Personal Meaning	Stress	-.182	-4.10	<.001	-.143	-3.13	.002
	Narcissism	.221	4.99	<.001	.177	3.84	<.001
	Ambiguity	-	-	-	.147	3.07	.002
		Multiple R = .289			Multiple R = .319		

In Step 1 of the first sequential regression, narcissism and stress together significantly predicted scores on the paranormal sub-scale of the CCQ. When ambiguity tolerance was added to the model in Step 2, the β of narcissism decreased slightly whereas the β for stress increased. However, ambiguity tolerance nonetheless accounted for additional variance in the scores on the paranormal sub-scale of the CCQ (multiple R increase from .271 to 343).

In the second regression, stress and narcissism were both significant predictors of DC in Step 1. When ambiguity tolerance was entered in Step 2, stress became non-significant, and the contribution of narcissism declined. In this model, ambiguity tolerance was a significant predictor of and accounted for additional variance in DC, as shown by the increase in the multiple R from .502 in the Step 1 to .585 in the Step 2.

In the third sequential regression, stress and narcissism were both significant predictors of Narrative Emplotment Scale scores. However, when ambiguity tolerance was entered into the model in Step 2, narcissism became non-significant, whereas the β weight for stress increased slightly. However, ambiguity tolerance was nonetheless a significant predictor of emplotment in the Step 2 model, and accounted for an increase in multiple R from .159 to .229 over the covariates alone.

In the last sequential regression, stress and narcissism were significant predictors of scores on the PMI. In Step 2, the covariate β's decreased (although remained significant) when ambiguity tolerance was added to the model. Ambiguity tolerance was a significant predictor of PMI scores, and increased the multiple R from .289 to .319.

Discussion of results for hypothesis 3. Hypothesis 3 had predicted inverse relationships between ambiguity tolerance and each of the DV measures (i.e., paranormal

and transpersonal sub-scales of the CCQ, Desire for Control, Narrative Emplotment Scale

scores, & the Personal Meaning Index). These predictions were based on the "reduction-

of-ambiguity" model, through which it was reasoned that low ambiguity tolerance would

motivate individuals to reduce the uncertainty of events and experiences that, as

previously characterized, pose intrusions, disruptions, or "threats" to their subjective sense

of existential coherence, sense of self-determination, or the stability of personal reality

beliefs. This prediction was not confirmed. In fact, the exact opposite was found.

Ambiguity tolerance *positively* correlated with four of the five DVs specified in the

hypothesis.

The question is "why"?[64] One possibility is that the connotation of the term

"ambiguity tolerance" may be somewhat misleading. An examination of the wording of

the items in the MSTAT suggests that a number of the items are not so much about

"tolerance" *per se*, but connote qualitatively more positive experiences, such as

enjoyment, preference, or even an attraction to ambiguity. For example, it is difficult to

see how items such as "I'm drawn to situations which can be interpreted in more than one

way," or "I prefer a situation in which there is some ambiguity" reflect "tolerance." In

developing the MSTAT, McLain (1993) had suggested that one of the problems in

measuring ambiguity tolerance was in how it was conceptualized. He claimed that there

were three different unidimensional aspects of ambiguity: (a) as a source of threat and

---

[64]

My first thought was that I had made a gross error in constructing the scale. Some of the items in the MSTAT are expressed in the negative (i.e., agreement with the statement means lower tolerance), and must be reverse coded to align them in a positive direction before the items are summed to create a total score. Because of this, the possibility existed that I had reverse coded the wrong items and accidentally created a total scale score in which higher values meant lower tolerance. I checked the raw data, the reverse coded data, and the total score. The scale had been correctly constructed.

uncertainty; (b) as a "probabilistic" issue in evaluating information in decision-making

contexts; and (c) as a variable associated with prejudice and social intolerance of others.

In creating the MSTAT, McLain attempted to capture the complexity of ambiguity

tolerance by including items that covered a range "from rejection to attraction, of

reactions to stimuli perceived as unfamiliar, complex, dynamically uncertain, or subject to

multiple conflicting interpretations" (p. 184). In developing the scale from an original item

pool of 40 items, McLain based the final 22-item scale on the results of a single-factor

principle components analysis (total explained variance was not reported by McLain).

This single dimension was conceptualized as reflecting a "general tolerance for ambiguity"

factor (p. 186) that included aspects of traditional conceptions of "tolerance" (as grudging

acceptance) as well as aspects more reflective of positive experiences of ambiguity.[65]

Ironically perhaps, the creation of a general measure of ambiguity may have added

ambiguity to the ambiguity construct, and certainly would make it difficult to compare the

results of studies using the MSTAT to the results of studies using more narrowly defined

measures of ambiguity. Herein may lie the "problem" with the results of the current study.

The logical construction of hypothesis 3 was based primarily on several studies

that had used a different measure of ambiguity tolerance. Keinan's study of magical

thinking (1991) used MacDonald's (1970) AT-20 measure of ambiguity tolerance, as did

Houran and associates in their series of studies on fear of the paranormal (1996, 1997,

1998). As reported by McLain (1993) the AT-20 correlates at $r = .58$ with the MSTAT.

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[65]

As a check, I performed an exploratory factor analysis of the 22 ambiguity tolerance items, and McLain's single dimension solution was replicated in my own data (55.39% of variance explained). Additionally, I used a Varimax rotation and found five distinct sub-factors which support McLain's suggestion that the MSTAT covers a range from tolerance as "acceptance of " to "attraction to" ambiguity.

This level of inter-scale correlation is certainly within the range typically used by researchers to provide evidence of concurrent validity. However, 33% shared variance means that 67% of the variance is not shared. Some of this variance will be error, but some of it may not. Given that both the MSTAT and the AT-20 have reasonably high internal reliability,[66] it then is likely that the scales in part measure different aspects of ambiguity tolerance. Although MacDonald (1970) shared the view with McLain (1993) that ambiguity tolerance consisted of a range of reaction to ambiguity from threat to desirability, this belief may not have been reflected in the AT-20 to the extent that it is in the MSTAT. A cursory examination of the items comprising the AT-20 suggests that only one item can be clearly considered, from a face validity perspective, as reflecting ambiguity as a source of attraction or enjoyment.[67] The wordings of the other items in the AT-20 seem to more ostensibly measure discomfort and anxiety with ambiguity and a kind of preference for "black and white" clarity in problem situations. Thus, the AT-20 can be thought of as measuring the "threat" dimension of ambiguity more so than the MSTAT, which places greater emphasis on the enjoyable aspects of ambiguity (e.g., pleasant surprises, novelty, fun in tackling complex puzzles, etc.). Unfortunately, I did not fully appreciate this distinction when I began this study and formulated the hypotheses on the basis of prior studies of magical thinking and fear of the paranormal that had used the more "threat-oriented" AT-20 scale.

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[66]

For the AT-20, split-half Spearman-Brown of .86 and KR-20 of .73, as reported by MacDonald (1970); and Cronbach's Alpha of .86 for the MSTAT, as reported by McLain (1993).

[67]

The item in question is worded "I like to fool around with new ideas, even if they turn out later to be a total waste of time" (MacDonald, 1970, p.793).

Nonetheless, the results of the analyses for hypothesis 3 are not without some

redeeming informational value. First, the finding that MSTAT ambiguity tolerance was

positively correlated with paranormal interpretations of coincidences (zero-order $r = .214$,

$p < .001$) is an indirect replication of Houran and Williams (1998) findings that, in addition

to being positively correlated with fear of the paranormal, ambiguity tolerance was also

positively correlated with belief in and experience of the paranormal ($rs = .19$ & $.30$

respectively, both $ps < .05$; as reported in Houran & Williams, 1998). Of further interest

is the fact that in the current study narcissism partially mediated this relationship and

reduced the strength of the correlation to $r = .163, p < .001$. Houran and Williams used

the Anomalous Experiences Inventory (AEI; Gallagher, Kumar, & Pekala, 1994) in their

study and, in an individual item analysis, found ambiguity tolerance to correlate positively

with AEI belief items worded "I feel my mind can expand beyond its usual boundaries,"

and "I have lived before." From the perspective of narcissism, these two items both

suggest the expansion of ego, the former outward through space and the latter backward

through time, both of which could be considered as reflecting the self-enhancing

dimension of narcissism. Thus, one possible explanation of why ambiguity tolerance could

positively correlate with the paranormal subscale of the CCQ, rather than negatively as

had been originally predicted by way of an ambiguity-reduction hypothesis, is that, in part,

ambiguity tolerance provides the ego with more "opportunity" to construct self-enhancing

beliefs. As a consequence, individuals higher in narcissism may be able to take greater

advantage of this potential (as is suggested by the significant path from narcissism to

CCQ_para in the mediational analysis shown in Table 20 and Figure 7).

The correlation between ambiguity tolerance and paranormal interpretations of

coincidence *increased*, however, when the effects of stress were partialled out of the relationship. This is not conceptually inconsistent with Keinan's (1991) findings. Keinan found that under conditions of threat and uncertainty (stress), high ambiguity tolerant individuals engaged in less magical thinking than low tolerant individuals. Recall, however, that Keinan also used the AT-20, which is more "threat-oriented" than the MSTAT. In the current study, the mediational analysis (Table 21 & Figure 7) suggests that lower levels of stress may decrease paranormal interpretations of chance, possibly by, so to speak, lowering an ambiguity tolerance threshold (as is suggested by the significantly lower paranormal interpretations found *only* in the low stress/low tolerance condition). If the MSTAT also measures a positive aspect of the experience of ambiguous stimuli (such as the enjoyment of novelty and surprise), then it may be that the novelty of a coincidence may be experienced as an enjoyable surprise rather than as a threat, so that instead of "rejecting" the threatening possibility of a paranormal interpretations, ambiguity-tolerant individuals would accept them.

The second sub-hypothesis of hypothesis 3 predicted an inverse correlation between ambiguity tolerance and desire for control, on the basis that ambiguity, as a "threat" to perceptions of coherence and order, would be more salient and less tolerable for those with a high desire for control. Again, this reasoning was based on a "threat" conception of ambiguity. The results, however, did not support this prediction. Ambiguity tolerance was shown to be positively correlated with the desire for control (zero-order $r = .494, p < .001$). I think the most likely reason for this finding is that the Desire for Control scale (DC) and the MSTAT share conceptual overlap. Each scale contains several items that in effect mirror items in the other. For example, the MSTAT

contains the item "I'm good at managing unpredictable situations," whereas the DC scale

contains the item "I consider myself to be generally more capable of handling situations

than others are" ($r = .292$, $p < .001$). Both items are related to ability beliefs *in situations*.

Another example is the MSTAT item "There are many situations in which I would prefer

only one choice rather than having to make a decision" and a DC item "I find it hard to

make a choice when the outcome is uncertain" ($r = .358$, $p < .001$). Both of these items

are reverse scored for the purpose of scale construction, and they both concern

preferences for choice in ambiguous conditions. Like the MSTAT, which reflects an

element of preference for ambiguity, the DC scale reflects preference for indeterminate

situations in which control can be applied. Ambiguous situations would afford the

individual with an opportunity for the expression of DC, and thus, might be more sought

out by those with higher levels of DC than those with lower levels.

Although stress did not mediate the correlation between ambiguity tolerance and

DC scores, narcissism was found to partially mediate the relationship (see Table 22 &

Figure 9). This is also most likely due to an element of construct overlap. The NPI

consists of seven subscales (Raskin & Terry, 1988), each of which is correlated to DC.

Table 29 (below) shows the zero-order and partial correlations (controlling for ambiguity

tolerance) of DC to each of the NPI sub-scales in the current study.

Although all of the NPI subscales are correlated with DC, it is interesting to note

that the highest correlations are with the NPI subscales measuring "Authority" (example

item: "I would prefer to be a leader") and "Self-sufficiency" (example item: "I rarely

depend on anyone else to get things done"). Raskin and Terry (1988) report these as the

first two factors of the scale in their principal component analysis. In a seven factor

Table 29

Correlations between DC and seven sub-scales of the NPI

NPI sub-scale	DC Zero-order r	partial r controlling for Ambiguity Tolerance
1. Authority	.559***	.487***
2. Self-sufficiency	.361***	.301***
3. Entitlement	.281***	.296***
4. Exploitiveness	.242***	.163***
5. Superiority	.218***	.173***
6. Exhibitionism	.217***	.164***
7. Vanity	.166***	.165***
Total NPI score	.495***	.423***

$* p < .05, ** p < .01, *** p < .001$

solution PCA analysis of my own data, an "authority" component was also the first

component and accounted for a higher proportion of the total scale variance than any

other component (14.31% of total 39.21% explained, unrotated; 7.42% rotated). Thus,

the NPI clearly has some degree of construct overlap with DC that would account for the

partial mediation effect of NPI on the relationship between ambiguity tolerance and desire

for control. The sequential regression showed more or less the same results -- that after

controlling for the effects of stress and NPI, ambiguity tolerance accounted for more of

the variability in DC than NPI alone.

Contrary to the original hypothesis, ambiguity tolerance was also found to

positively correlate with scores on the Narrative Emplotment Scale (NES). Whereas the

original prediction of an inverse relationship had been made on the basis of an "ambiguity-

reduction" model of ambiguity tolerance, the results are more consistent with the

conception of an "ambiguity-openness" model of tolerance, such that chance events and

coincidences would not be experienced so much as threats to perceptions of order and meaning, but rather, experienced as pleasant surprises or interesting puzzles through which the "meanings" of the events could be, in a manner of speaking, creatively played with by individuals who could tolerate the ambiguity of the events and their meanings. Both the mediational tests and the sequential regression involving ambiguity as a predictor of emplotment shows that the narcissism played no significant role in this relationship, but that stress did. The differential effects of stress seem to be similar to those found in the relationship of ambiguity tolerance to paranormal interpretation of chance events -- that is, that stress does not affect emplotment scores in high ambiguity tolerant individuals, but increases emplotment for low tolerance individuals.

Finally, ambiguity tolerance was found to be positively associated with scores on the Personal Meaning Index (PMI). Again, this result is contrary to the original prediction of an inverse relationship which had been based on an ambiguity-reduction model in which individual variation in perceived existential coherence, sense of life purpose and goals, and so on, had been conceived in part as a consequence of individual differences in a need to reduce ambiguity. Rather, the results support a more positive "ambiguity openness" conception of the role of ambiguity tolerance in the creation of personal meaning, such that, for example, an individual who was initially predisposed to "going with the flow" of daily experience would allow him or herself more flexibility and opportunity to find a meaningful and adaptive fit between self and circumstance.

The mediational checks showed that the link between ambiguity tolerance and PMI scores were partially mediated by narcissism and stress. Table 26 and Figure 13 show that narcissism made a significant contribution to PMI scores. As previously argued in this

paper (see "Discussion of hypothesis 1 results" section), narcissism can be seen as reflecting creativity in self-reflection as well as the more traditionally conceived motives of self-enhancement and grandiosity. If this is true, then the contribution of narcissism to personal meaning makes sense insofar as personal meaning is a creative construction that would benefit from the heightened self-reflection afforded by narcissism.

Stress, on the other hand, mediates the association between ambiguity tolerance and PMI in the opposite direction. Table 27 and Figure 14 suggest that heightened levels of stress are associated with slightly lower scores on the PMI and reduce the strength of the association between ambiguity tolerance and PMI. This finding is consistent with previously described results in which stress had an attenuating effect on "openness" to ambiguity. The results of the sequential regression show, nonetheless, that after controlling for the effect of both covariates, ambiguity tolerance still made a significant contribution to scores on the PMI.

Hypothesis 4: Ambiguity Tolerance and Emplotment Task Persistence

The fourth hypothesis predicted that ambiguity tolerance would be inversely associated with measures of emplotment task persistence; specifically, it was thought that MSTAT scores would be negatively correlated with time-on-task, and, depending on the task condition, either the number of memory-image associations made or the number of events described in the coincidence stories. As with the previous hypothesis, these predictions were based on an "ambiguity-reduction" conception of ambiguity tolerance. These predictions were not confirmed, and as in hypothesis 3, the exact opposite was found -- ambiguity tolerance positively correlated with measures of persistence (although the correlations were small, and only two of the three associations were significant).

Correlational analysis. Table 30 (below) shows the correlations between ambiguity

tolerance and the three measures of emplotment task persistence. As can be seen from

Table 30, ambiguity tolerance correlated positively with the amount of time students spent

on the emplotment task, and the strength of the association was increased by partialling

out the effects of narcissism alone as well as narcissism and stress together. Ambiguity

tolerance was also found to correlate with the number of image-memory associations

made by students who did the image-association task. This correlation was not

substantially altered by removing the effects of the covariates. Finally, none of the

correlations between ambiguity tolerance and the number of events in the coincidence

stories was significant.

Table 30

Hypothesis 4: Correlations between ambiguity tolerance and task persistence measures

		partial correlations controlling for		
ambiguity tolerance with	Zero-order	Narcissism	Stress	Narciss. & Stress
Time on task	.155**	.199***	.154**	.203***
Number of images	.195**	.190**	.198**	.192**
Number of story events	.059	.046	.037	.031

$* p < .05, ** p < .01, *** p < .001$

Mediational analyses. Because the pattern of partial correlations (Table 30)

suggests mediation effects for both covariates, mediation tests were computed for each

IV-CV relationship on time-on-task and the number of image-associations. Results of the

regressions testing for the mediational effects of narcissism on the relationship between

ambiguity tolerance (MSTAT) and time-on-task are shown below in Table 31 and Figure

15. The results show that, rather than a mediation effect, the adjustment increased the

strength of the relationship, suggestive of a suppression effect of ambiguity tolerance on

the effects of NPI on task-on-time scores.

Table 31

Mediational analysis: NPI as a mediator of ambiguity tolerance & time-on-task

Regression	Beta	t	p
1. Ambiguity tolerance ← NPI	.304	6.99	< .0001
2. Ambiguity tolerance ← Time-on-task	.155	2.87	< .0040
3. NPI ← Time-on-task	-.166	-2.91	< .0040
Ambiguity tolerance ← Time-on-task	.210	3.67	< .0001

Figure 15

Path diagram: NPI as a mediator of ambiguity tolerance on time-on-task
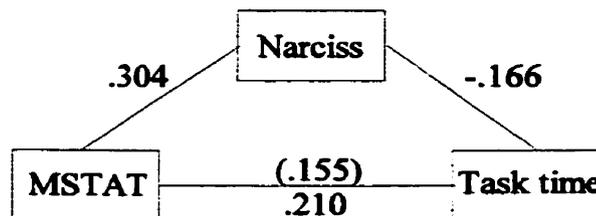
A second analysis was done to test for any mediation effects of stress on the

association between ambiguity tolerance and time-on-task. The results of the regressions

are presented below in Table 32 and Figure 16. The results failed to show any mediation

effects of stress on the relationship between ambiguity tolerance and time-on-task.

Table 32

Mediational analysis: Stress as a mediator of ambiguity tolerance & time-on-task

Regression	Beta	t	p
1. Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2. Ambiguity tolerance ← Time-on-task	.155	2.87	< .0040
3. Stress ← Time-on-task	-.001	-0.03	< .9790
Ambiguity tolerance ← Time-on-task	.161	2.85	< .0050

Figure 16

Path diagram: Stress as a mediator of ambiguity tolerance on time-on-task
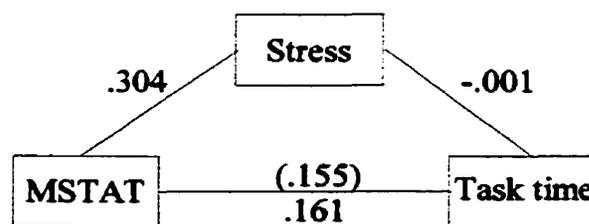
Even though the correlational analysis of the relationship between ambiguity

tolerance and the number of image associations showed very small changes when

narcissism or stress were partialled out of the correlation, two additional mediational

analyses were done to confirm if, in fact, any mediation effects at all were present. First,

regressions were run to test for any mediation effects of narcissism on the relationship

between ambiguity tolerance and number of image associations made by students who did

the image association task. The results of these regressions are presented below in Table

33 and Figure 17.

Table 33

Mediational analysis: NPI as a mediator of ambiguity tolerance & number of images

Regression	Beta	t	p
1. Ambiguity tolerance ← NPI	.304	6.99	< .0001
2. Ambiguity tolerance ← Number of images	.195	2.98	< .0030
3. NPI ← Number of images	-.021	-0.29	.7680
Ambiguity tolerance ← Number of images	.201	2.87	< .0040

Figure 17

Path diagram: NPI as a mediator of ambiguity tolerance on number of images
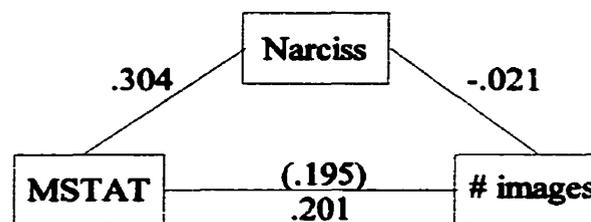
The results show that NPI did not mediate the relationship between ambiguity

tolerance and the number of image-associations made by students who did the image

association task.

A second set of regressions was then computed to "double check" for any

possible mediation effects of stress on the association between ambiguity tolerance and the

number of image associations made by students who did the image association task.

Results are presented below in Table 34 and Figure 18.

Table 34

Mediational analysis: Stress as a mediator of ambiguity tolerance & number of images

Regression		Beta	t	p
1.	Ambiguity tolerance ← Stress	-.260	-5.97	< .0001
2.	Ambiguity tolerance ← Number of images	.195	2.98	< .0030
3.	Stress ← Number of images	-.025	-0.37	< .7120
	Ambiguity tolerance ← Number of images	.204	3.00	< .0030

Figure 18

Path diagram: Stress as a mediator of ambiguity tolerance on number of images
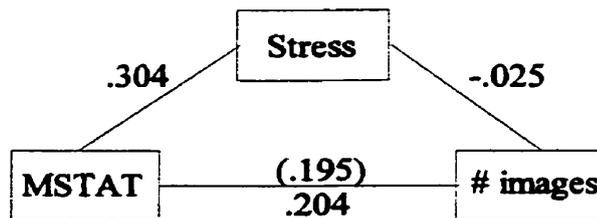
The results show that stress did not mediate the relationship between ambiguity tolerance

and the number of image associations. Because the correlational analysis showed no

significant correlations between ambiguity tolerance and number of events described in the

stories, no further analyses were done on this measure of persistence.

Sequential regressions. Two sequential regressions were computed to evaluate

the combined effects of both covariates on the relationships of ambiguity tolerance to

time-on-task and number of image associations. The results of these regressions are

presented below in Table 35.

Table 35

Sequential regressions for hypothesis 4.

DV	Cov/IV	Step 1			Step 2		
		β	t	p	β	t	p
Time on Task	Stress	-.040	-0.72	.475	.019	0.34	.734
	Narcissism	-.098	-1.78	.076	-.170	-2.94	.003
	Ambiguity	-	-	-	.222	3.72	<.001
		Multiple R = .105			Multiple R = .227		
Number of Images	Stress	-.078	-1.15	.035	-.026	-0.37	.709
	Narcissism	.050	0.74	.458	-.019	-0.27	.790
	Ambiguity	-	-	-	.210	2.87	.005
		Multiple R = .092			Multiple R = .212		

The sequential regression for time-on-task shows that by themselves, in Step 1,

neither stress nor narcissism was a significant predictor of the time spent by students on

the emplotment task. In Step 2, however, the addition of ambiguity tolerance to the

model substantially increased the multiple R from that of Step 1 and also "caused"

narcissism to become a significant predictor of time-on-task, suggesting that ambiguity

tolerance suppressed irrelevant nonerror variance in NPI (and vice versa).

To examine this reciprocal suppression effect in greater detail, I used a two-step procedure to attempt to determine which aspects of ambiguity tolerance might be implicated in the suppression effect. The first step involved looking at the pattern of zero-order correlations between the five sub-factors of the MSTAT scale, the NPI scores, and the time-on-task scores. The aim of this first step was to determine if there were any ambiguity tolerance sub-factors that (a) correlated with the NPI scores but (b) *not* with time-on-task scores in order to identify sources of shared variance between the predictors that, in ambiguity tolerance, was unrelated ("irrelevant") to the dependent measure. The five sub-factor scores of the MSTAT had been previously created as a "check" for the multidimensionality of the scale (referred to in footnote 65, p. 111) to determine if the MSTAT was measuring a range of responses to ambiguity from (traditionally conceived) "tolerance" of ambiguity to "preference" for ambiguity. The sub-factors were interpreted as (Factor 1) traditional "tolerance," (Factor II) "non-avoidance of ambiguous problems," (Factor III) "self-efficacy in coping with unexpected events," (Factor IV) "enjoyment of solving problems," and (Factor V) "preference for novelty and surprise." Table 36 (below) shows the correlations of the five ambiguity tolerance subfactors to NPI and time-on-task scores.

As Table 36 shows, all of the ambiguity tolerance sub-scales were positively correlated with the NPI, but not with time-on-task scores. Two ambiguity sub-factors ("self-efficacy in coping with the unexpected" and "preference for novelty") were unassociated with the time spent on the task, suggesting that the effects of ambiguity tolerance on time-on-task were due to those aspects of ambiguity of tolerance related to

Table 36

Correlations between ambiguity tolerance sub-factors and NPI and time-on-task scores

Ambiguity tolerance subscale	Narcissism	Time-on-task
Total Ambiguity tolerance scale	.304**	.155**
Factor I: traditional tolerance of ambiguity	.118**	.107*
Factor II: non-avoidance of ambiguous problems	.226**	.131*
Factor III: self-efficacy in coping with unexpected events	.314**	.084
Factor IV: enjoyment of problem solving	.265**	.158**
Factor V: preference for novelty & surprise	.281**	.079

$* p < .05, ** p < .01, *** p < .001$

traditional ("begrudging acceptance") tolerance and problem solving. The remaining two

subfactors – self-efficacy in coping with unexpected events and preference for novelty

were, on the other hand, the two factors of MSTAT that were most strongly correlated

with NPI scores, but because of their non-significant relationship to time-on-task, would

introduce systematic nonerror ("irrelevant") variance into the correlation between NPI and

time-on-task. In the second step, partial correlations were computed between NPI and

time-on-task controlling for the effects of the self-efficacy and preference for novelty

subscales of the MSTAT. The results of this analysis are shown below in Table 37.

Table 37

Zero-order and partial correlations between NPI and time-on-task

	Time-on-task	partial *r* controlling for			
	Zero-order *r*	MSTAT	MSTAT efficacy	MSTAT preference	Both
NPI score	-.083	-.159**	-.123*	-.116*	-.135*

$* p < .05, ** p < .01, *** p < .001$

As shown in Table 37, the suggestion of a suppression effect of ambiguity

tolerance on NPI is still present. However, the size and significance of the suppression

effect (i.e., the enhancement of NPI as a predictor) is reduced when removing the effects

of only those elements of MSTAT that are correlated with NPI but unrelated to time-on-

task relative to controlling for the effects of the full-scale MSTAT measure. In order to

bring some closure to the difficult problem of interpreting the suppression, I finally created

a "reduced" MSTAT measure, consisting only of the MSTAT subfactors that significantly

correlated with both NPI and Time-on-task (i.e., eliminating the criterion-irrelevant

MSTAT subfactors), and ran the correlational analysis again.

Table 38

Zero-order and partial correlations of MSTAT "full" and "reduced" scales with time-on-
task

	MSTAT full scale Zero-order r	MSTAT full scale controlling for NPI	MSTAT reduced scale Zero-order r	MSTAT reduced scale controlling for NPI
Time-on-task	.155**	.199***	.165**	.197***

$* p < .05, ** p < .01, *** p < .001$

Table 38 shows that the zero-order correlation between the reduced MSTAT scale

and time-on-task is higher than the zero-order r for the full scale, but that neither the full

nor reduced scales correlations with time-on-task were meaningfully different when

controlling for NPI, suggesting that the reciprocal suppression effect found in the original

sequential regression is due to a combination of the "cleaning out" of some of the nonerror variance shared by NPI and MSTAT (i.e., traditional tolerance and non-avoidance of problems), plus the removal of some of the variance in MSTAT that is uncorrelated to time-on-task (i.e., self-efficacy in dealing with unexpected events and the enjoyment of novelty). When all is "said and done," however, the fact remains that ambiguity tolerance was positively associated with time-on-task, and narcissism was negatively associated with time-on-task. These univariate effects were more apparent when both predictors were included in the model.

In the second sequential regression, stress was a significant but weak predictor of number of image associations. When ambiguity tolerance was added to the model in Step 2, both covariates became non-significant, and the multiple R increased substantially.

Discussion of results of hypothesis 4. As noted previously, the predictions of hypothesis 4 were not confirmed by the data. For two of the three sub-hypotheses, the results were in fact in the opposite of the hypothesized direction: ambiguity tolerance was positively (rather than negatively) associated with time-on-task and the number of image associations made by those who did the memory-image association task. As in hypothesis 3, one explanation for this may be that the tasks were not cognitively "threatening" to the students, but may have rather been experienced as pleasant or enjoyable puzzles, in which case ambiguity tolerance (which as argued previously measures as ambiguity preference as well as begrudging acceptance) may have promoted engagement with the task, which in turn was reflected in the amount of time students spent on the task and the number of randomly-chosen images they were able to creatively link to their memories.

Stress did not mediate these relationships. This is understandable given that the stress measure was taken in Phase I of the study, several weeks before students did the Phase II task. However, there was some indication that narcissism (also measured during Phase I, but presumably more of a stable trait measure than stress) did alter the strength of the relationship between ambiguity tolerance and time-on-task several weeks later. The effect was not a formal mediation (in the sense of reducing the strength of the IV-DV relationship); but rather, ambiguity tolerance acted more like as a suppressor of narcissism. One interpretation of this suppression effect, which I think is reasonable, is that narcissistic individuals by virtue of their prior experience in self-reflection and egocentric relationship to the external world work more efficiently on self-related tasks and thus take less time to do them (thus, a negative β weight in Step 2 of the first sequential regression). This effect, however, is small, and only was apparent after ambiguity tolerance was entered into the model and "suppressed" the irrelevant nonerror variance in the NPI scores.

Hypothesis 5: Combined effects of DC and MSTAT on Emplotment Task Persistence

The fifth hypothesis was more speculative in character and predicted an interaction between ambiguity tolerance and desire for control on emplotment task persistence. Specifically, it was hypothesized that those having low ambiguity tolerance in combination with high desire for control would be motivated to reduce the ambiguity and control the meaning of the emplotment task more than those with high ambiguity tolerance and a low desire for control, who, it was predicted, would have lowest ratings on the emplotment task measures (i.e., time-on-task, number of images associated, and number of events described in the story).

The test of the interaction between tolerance of ambiguity and the desire for control on the three emplotment task scores was accomplished using a basic 2 x 2 factorial ANOVA design. Neither of the covariates (stress and narcissism) that were used in the previous regression analyses was used in these analyses because neither had a zero-order correlation greater than .20 with either time-on-task, number of images used, or number of events described in the stories. Participants were classified, on the basis of a median-split, as being either "low" or "high" in tolerance for ambiguity and as either "low" or "high" on desire for control. These two dichotomized classification variables were used as the independent factors, with each emplotment task measure used as the DV in the design.

DC by MSTAT on Time-on-task. Results of the first 2 x 2 ANOVA are shown below in Table 39 and Figure 19. The prediction was not supported. The overall model was not significant, and the pattern of cell means was not as expected. Although power was suboptimal, a significant univariate main effect of ambiguity tolerance was observed, in which students classified as "high" ambiguity-tolerant spent more time on the task than students classified as "low" ambiguity tolerant ($M = 0.153$, $sd = 1.08$ vs. $M = -0.095$, $sd = 0.87$).

DC by MSTAT on number of matched images. Results of the second 2 x 2 ANOVA are shown below in Table 40 and Figure 20. The model was not significant, although a marginally significant main effect for MSTAT suggests that high MSTAT students matched slightly more images than low MSTAT students ($M = 7.09$, $sd = 1.71$ vs. $M = 6.66$, $sd = 1.73$, respectively).

Table 39

Hypothesis 5: MSTAT by DC on time-on-task

Source	Type III SS	df	MS	F	p	η^2	power
Model	5.20	3	1.75	1.79	.149	.016	.464
MSTAT	4.93	1	4.93	5.04	.025	.015	.610
DC	.01	1	.01	0.13	.908	.013	.052
MSTAT x DC	.21	1	.21	.21	.647	.001	.074
error	316.98	324	.98				
total	322.48	328					

Figure 19

Hypothesis 5: Plot of marginal means for MSTAT by DC on time-on-task
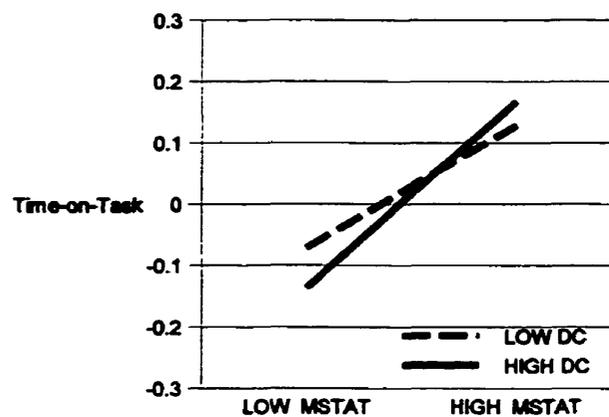
Table 40

Hypothesis 5: MSTAT by DC on number of matched images

Source	Type III SS	df	MS	F	p	η^2	power
Model	11.50	3	3.83	1.29	.280	.018	.341
MSTAT	11.21	1	11.21	3.76	.054	.017	.489
DC	.92	1	.92	0.31	.578	.001	.086
MSTAT x DC	.48	1	.48	0.16	.690	.001	.068
error	640.19	215	2.98				
total	11008.00	219					

Figure 20

Hypothesis 5: Plot of marginal means for MSTAT by DC on number of matched images
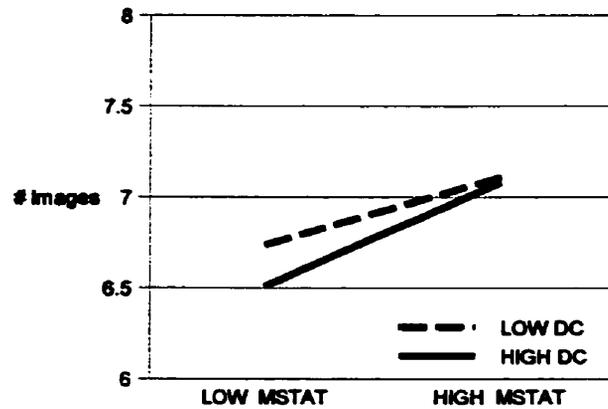
DC by MSTAT on number of events in stories. Results of the third 2 x 2 ANOVA

are shown below in Table 41 and Figure 21. The overall model was not significant, nor

were any of the univariate main effects.

Table 41

Hypothesis 5: MSTAT by DC on number of story events

Source	Type III SS	df	MS	F	p	η^2	power
Model	7.30	3	2.43	0.70	.555	.009	.196
MSTAT	4.27	1	4.27	1.22	.270	.005	.196
DC	.88	1	.88	0.25	.617	.001	.079
MSTAT x DC	2.67	1	2.67	0.76	.383	.003	.140
error	779.08	223	3.49				
total	3351.00	227					

Figure 21

Hypothesis 5: Plot of marginal means for MSTAT by DC on number of story events
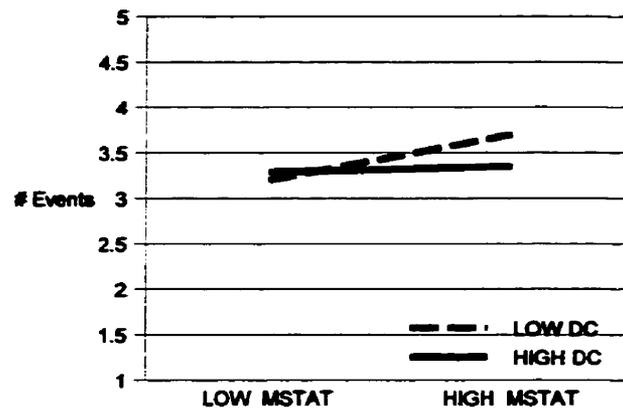
Discussion of hypothesis 5. The predictions of hypothesis 5 were not supported by

the ANOVA tests. The hypothesis was based on the logic of previous hypotheses in

which ambiguity was conceptualized as a "threat" to the orderliness of perception. In

conjunction with desire for control, conceived of as a motive to bring order to disorder, it

was predicted that the combination of low ambiguity tolerance paired with high desire for

control would have resulted in greater effort in the emplotment task However, as

previously discussed, the consistent pattern of results from hypotheses 3 and 4 suggest

that the data fit better with an "openness-to-ambiguity" conception of ambiguity tolerance

than a "threat" conception. This same pattern was evident in the results of hypothesis 5 as

well: for time-on-task and number of images; "high" ambiguity tolerance was associated

with greater emplotment task engagement than "low tolerance," suggesting that the task

itself was not sufficiently difficult, convoluted, or ambiguous enough to constitute a

cognitive threat to the participants. Second, the lack of main effects for desire for control

may be related to the possible "reciprocal" suppression effect described in the results sub-section for hypothesis 2. In hypothesis 2, DC, by itself, was not a significant predictor of time-on-task, nor was NPI. However, when both variables were included in the sequential regression, both became significant (NPI with a negative beta, and DC with a positive beta, see Table 18). Put in context, the suggestion was made (see "Discussion of results for hypothesis 2") that the well-practised *time-efficiency of narcissism* in doing a self-centric task (i.e., quicker response in processing self-relevant information) was "offset" by the *time-inefficiency* of DC (i.e., DC motivates increased time expenditure on tasks). Given that the DC main effect component of hypothesis 5 is the ANOVA version of hypothesis 2 without the covariates, it is not surprising that the same non-significant results occurred. In fact, in the absence of an MSTAT by DC interaction, hypothesis 5 is redundant with hypotheses 2 and 4, and adds no further information.

General Summary of Formal Hypotheses Results

Hypotheses were made concerning the role played by two personality variables --desire for control (DC) and ambiguity tolerance (MSTAT) -- in what I have called the "narrative emplotment" of chance events. As a general control motivation variable, it was predicted that DC would be positively associated with various measures related to the creation of subjective personal meaning. On the other hand, tolerance for ambiguity, as a cognitive trait, was predicted to be *negatively* associated with measures of emplotment and the creation of personal meaning on the basis that high levels of ambiguity tolerance would sustain an "openness" to the vicissitudes of experience and reduce the need for explanatory "closure," whereas low ambiguity tolerance would lead to perceptions of chance events as "threats" to be dealt with through the creation of meaning. Following

from these two conceptions, it was then predicted that individuals classified as "high" in DC and "low" in MSTAT would be more motivationally and cognitively predisposed or psychologically enabled to score higher in an experimental emplotment task than those "low" in DC and "high" in MSTAT.

The results provide fairly good evidence that, as predicted, desire for control is positively associated with narrative emplotment and the creation of personal meaning. DC was found to be significantly and positively associated with scores on the Narrative Emplotment Scale (emplotment of the past), the Possible Lives Questionnaire (emplotment of the future), and the Personal Meaning Index of the Life Attitude Profile (a general measure of an individual's overall sense of purpose, meaning, and coherence in life). Although the effect sizes of the relationships were small and typically attenuated when adjusted for the effects of stress and/or narcissism, the direction and significance of the relationships was maintained. However, in the experimental emplotment task, DC was not a significant predictor of task performance, although the direction of the correlations was in the predicted direction for time-on-task and the number of image associations made by the participants. When controlling for the effects of narcissism, the correlation between DC and time-on-task increased, and became barely significant, with the results of the sequential regression suggesting something akin to a "cancelling out" effect in which the increased time given to the task by desire for control was reduced by the well-practised "efficiency" provided by narcissism in performing self-centric tasks. The lack of significant findings linking DC to the other two emplotment task performance measures -- number of images produced and number of events described -- was explained by speculating on the nature of the task demands. For the number of images associated, it

may have been the case that the task was not demanding enough to allow the full effects of desire for control to manifest, and the suggestion was made that increasing the number of image associations required, for example, from 10 to 20, may have resulted in greater variability in the scores that in turn would have been more strongly associated with desire for control. For the number of events described in the stories, restricted range may have been the source of the lack of significant findings. Participants may have only considered the proximal events of their experiences, and the suggestion was made that the influence of DC may have been more apparent had the participants been required to identify and outline distal events in the "chain" of circumstances leading up to the coincidence.

Concerning ambiguity tolerance, none of the eight sub-hypotheses was supported by the results of this study, and six of these were, in fact, contrary to the predictions. Ambiguity tolerance was *positively* (rather than negatively) correlated with paranormal interpretations of chance, desire for control, narrative emplotment, and personal meaning; and in the experimental task, positively correlated with time-on-task and the number of image associations made. Although the strengths of the relationships were variously altered by controlling for the effects of stress and/or narcissism, these relationships held. One possible reason for these contrary results may be in the conceptualization of tolerance for ambiguity. The hypotheses of the study were grounded in prior research that had used measures of ambiguity tolerance largely based on the conception of ambiguity as a "threat" to cognition. In this study, a newer scale was used which measures more than just "begrudging acceptance" of ambiguity but also measures "positive" aspects of the individual's response to ambiguity, such as the enjoyment of novelty and the challenge of tackling ambiguous puzzles and problems. The results of this study seem more

inductively supportive of an "openness" to ambiguity conception of ambiguity tolerance than they support a "threat" conception, in which unpredictable ambiguous events may, in a manner of speaking, "invite" a creative engagement with them that leads to the creation of personal meaning rather than being a "threat" to it. The finding that ambiguity tolerance and desire for control were positively, significantly, and substantially correlated effectively precluded any measurable interaction between them on emplotment task scores. As previously alluded to, construct overlap between the two measures may suggest a bi-directional enhancement in which the desire for control "experiences" ambiguity as non-threatening, and more so, perhaps facilitative of its own expression, whereas in turn, ambiguity tolerance may be enhanced by the motivation provided by DC to the individual not to foreclose on the vagaries of life but to extend control to ever-broadening domains of experience, including those of subjective personal meaning.

III. Supplementary Analyses

In hypotheses 1 through 5, the emplotment task measures were treated as dependent measures (i.e., time-on-task, number of images used, number of events in coincidence stories). In this section, the emplotment task is construed as an independent variable with several levels, and the general exploratory question is whether or not doing the task or the type of task is associated with any subsequent differences or changes in several post-task and follow-up measures. The main reason for this question, as described in the introduction to the study, was to assess whether or not the emplotment task, or variations of the task, may suggest or point toward the future development of any possible narrative intervention techniques.

Post-task Assessment

Post-task questionnaire. Immediately following completion of the tasks in Phase II

of the study, participants completed a short post-task questionnaire (contained in

Appendix XII). The form and wording of the post-task questions necessarily varied

depending on the task-condition (e.g., image association tasks vs. writing tasks); but

where possible, parallelism was built in to the questionnaires to make responses

comparable between conditions and combinable or collapsable across the study as a

whole. Participants who did the image-association task were asked if any of the images

they selected had "triggered" a sudden flood of memories ("yes," "no"), if any of the

randomly selected images matched "almost perfectly" any of the memories they had

previously written down ("yes," "no"), and the extent to which the images they had

selected "seemed to" be able to be "fit together" to make a story (rated on a scale from 1

= "not at all" to 7 = "very much"). Participants who did the writing tasks were asked to

identify the number of events in their coincidences, the "trigger" of the coincidence

(selected from a check-list), and the "theme" of the coincidence (also from a checklist).[68]

Those in the writing conditions were also asked to rate how "strange, weird, or surreal"

the coincidence was (1= "not at all" to 7 = "very much"), the emotional tone of the

coincidence (1 = "negative" to 7 = "positive"), how much "impact" the coincidence had in

their lives (1 = "no impact" to 7 = "a lot of impact"), and to identify the nature of the

impact from a checklist (e.g., romance-related impact, career-related impact, etc.).

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[68]

The content of the checklists were based on a content analysis of stories generated in the pilot study.
I am indebted to Cheryl Keachie, a former student, who took a great interest in this study and
volunteered many hours in the content analysis.

Finally, irrespective of condition, *all* participants in Phase II were asked to rate how frequently they thought about the memories they described (1 = "never" to 7 = "frequently"), how often they think about the role of chance and coincidence in their lives (1 = "never" to 7 = "frequently"), and lastly, the extent to which they each felt that doing the task had led them to now think differently about their memories than they had in the past (1 = "no effect" to 7 = "big effect").

Descriptive results in writing conditions. For descriptive purposes only, a rank-ordered list of "triggers" for the coincidence stories is provided below in Table 42. As can be seen from Table 42, chance meetings of others (known and unknown) were the two most frequently identified triggers of the described coincidences, together accounting for over a third (34%) of the coincidence stories, which suggests a strong social component to the experience of meaningful coincidence. The least reported trigger, on the other hand, was noticing recurrent trivial events (such as for example, people wearing red hats on the same day, etc.), which suggests that simple pattern perceptions are rarely a cause, in themselves, to make a coincidence noteworthy.

Table 43 (below) shows the ranked frequencies of identified "themes" of the coincidences. As can be seen from the table, the formation of social relationships (romances or friendships) were the top two rated categories, together accounting for 40.2% of themes, again suggesting a strong social component of meaningful coincidence.

Table 44 (below) shows the frequency distribution of the item that asked participants to rate how "strange, weird or surreal" the coincidence was. The mean "strangeness" rating was 4.81 (*SD* = 1.57), and the table below shows that 67.3% rated their experiences > 4 (the graphic midpoint of the scale).

Table 42

Trigger events of coincidence stories

Type of trigger	n	%
chance meeting of unknown other	45	18.0
chance meeting of known other	40	16.0
dream, hunch, intuition	39	15.6
unfortunate unplanned events	33	13.2
change in daily routine	25	10.0
communication (e.g., letter, phone call)	22	8.8
being in an unfamiliar location by choice (e.g., vacation)	15	6.0
being in an unfamiliar location not by choice (e.g., lost)	11	4.4
noticing recurrent trivial events	6	2.4
undefined "other" category	14	5.6
total	250	

Table 43

Themes of coincidence stories

Theme	n	%
meeting of romantic partner	56	22.3
formation of non-romantic friendship	45	17.9
solution to problem provided by chance	29	11.6
insight in goals and/or values	24	9.6
being saved from danger or harm	21	8.4
noetic perception (perception of mystery, new layer of reality)	20	8.0
winning or obtaining money	11	4.4
finding something lost	7	2.8
getting a job or promotion	3	1.2
undefined "other" category	35	19.9
total	251	

Table 44

Ratings of how strange, weird, or surreal the coincidence was

Rating		*n*	%	cum %
1 ("not at all")		11	4.4	4.4
2		16	6.4	10.8
3		20	8.0	18.7
4		35	13.9	32.7
5		84	33.5	66.1
6		50	19.9	86.1
7 ("very much so")		35	13.9	100.0
	total	251		

Table 45 (below) shows the distribution for participants' ratings of the impact of the coincidence in their lives. The average impact rating was 4.68 (*SD* = 4.68), with 60.5% of the participants rating the impact of their coincidences higher than the graphical midpoint of the scale (i.e., "4") suggesting that most participants recognize and/or believe that coincidence plays a "causal" role in the unfolding of their lives.

Table 45

Impact ratings of the coincidence

Rating		*n*	%	cum %
1 ("no impact")		20	8.0	8.0
2		28	11.2	19.1
3		26	10.4	29.5
4		25	10.0	39.4
5		49	19.5	59.0
6		45	17.9	76.9
7 ("a lot of impact")		58	23.1	100.0
	total	251		

When asked to rate how negative, neutral, or positive the experiences were (Table 46, below), the majority (72.9%) gave ratings toward the "positive" end of the rating scale.

Table 46

Ratings of how negative, neutral or positive the coincidence was

Rating	n	%	cum %
1 ("negative")	8	3.2	3.2
2	12	4.8	8.0
3	7	2.8	10.8
4 ("neutral")	41	16.3	27.1
5	39	15.5	42.6
6	59	23.5	66.1
7 ("positive")	85	33.9	100.0
total	251		

Table 47 (below) shows a rank-ordered list of the "type" of impact that the coincidences had in the lives of the participants.

Table 47

Classification of type of impact of coincidence

Type of impact	n	%
friendship-related impact	59	23.9
romantic-related impact	56	22.7
spiritual or religious impact	41	16.6
goal or decision-related impact	22	8.9
health-related impact	14	5.7
money-related impact	8	3.2
education-related impact	8	3.2
job or career-related impact	7	2.8
undefined "other" category	32	13.0
total	247	

Descriptively, the overall character of the coincidences that the participants described could be stated as such: they typically involve chance meetings of others, are rated as "strange, weird, or surreal," and are typically regarded as positive and impactful in their lives.

Descriptive results in image-association conditions. Of those who only did the image task (n = 114), 72.8% answered "yes" to the question that asked if any of the images had "triggered" a flood of memories. Table 48 (below) shows the ranked distribution of images (Appendix X) identified as triggering a "flood of memories" in the image-association task. Although the images were selected on the basis of similar salience ratings of the words used to designate them (see Method section), it is interesting to note that the image of the highway was reported as a memory "trigger" more often than any other image. No explanation is offered for this, other than the speculation that the image of a highway may, in our culture, have a mythic quality associated with adventure, freedom, and going towards one's destiny (destination), that would easily be associated with vivid personal memories of being on vacation, travelling, changing residence, etc. In the context of the study, the data were collected in the spring term of the school year, from students who were probably starting to think about and anticipate the end of school and the start of vacation.

Table 48

Images reported as triggers for memories

Image	*n*	%
highway	12	14.5
clouds	7	8.4
drum	7	8.4
rabbit	6	7.2
phone	6	7.2
book	5	6.0
toilet	5	6.0
boat	8	3.2
bucket	7	2.8
clown	4	4.8
house	4	4.8
spider	4	4.8
turtle	4	4.8
lips	3	3.6
sandal	3	3.6
skull	3	3.6
dress	1	1.2
gorilla	1	1.2
nail	0	0.0
pen	0	0.0
total	83	

Ninety-three students (82.3%) identified one image that was an "exact match" to one of their memories. Table 49 (below) show the ranked frequencies of images that the participants identified as "exact matches."

Table 49

Images reported as "exact matches" to memories

Image	n	%
house	13	14.0
highway	9	9.7
boat	7	7.5
clown	7	7.5
lips	7	7.5
sandal	7	7.5
book	6	6.5
clouds	4	4.3
drum	4	4.3
phone	4	4.3
skull	4	4.3
toilet	4	4.3
bucket	3	3.2
dress	3	3.2
pen	3	3.2
rabbit	3	3.2
spider	2	2.2
turtle	2	2.2
nail	1	1.1
gorilla	0	0.0
total	93	

The image of the house was the most frequent "exact match," followed by "highway" and "boat." Together these three suggest "summer vacation" memories, particularly in view of the fact that the image of the house was of a very plain "A-frame" bungalow of the type often used in the construction of summer cottages. The image of the gorilla was not an exact match for any student memories, which is understandable, given that students would not be likely to have had any experience with gorillas (although in the pilot study, one student did "exact match" the gorilla to a memory of seeing gorillas

in the wild while on vacation with her parents in Africa as a child).

Table 50 (below) shows the frequency distribution of responses to the question that asked students to rate the extent to which they believed the images they drew could have been arranged to form a story. The mean rating for this item was 3.74 $(SD = 1.49)$, and as the table shows, most students (63.4%) rated the "storyability" of their image sets at or below the graphic midpoint of "4" on the rating scale.

Table 50

Ratings of how easily images could be formed into a story

Rating		n	%	cum %
1 ("not at all")		6	5.4	5.4
2		22	19.6	25.0
3		23	20.5	45.5
4		20	17.9	63.4
5		28	25.0	88.4
6		11	9.8	98.2
7 ("very much")		2	1.8	100.0
	total	112		

Descriptively, the overall characterization of the image association task is that most students did experience a "memory flood" triggered by one of the images and that one of the images was also an "exact match" to one of their memories. Typically, the images identified as triggers or exact matches, as suggested, were images that could be associated with travelling and summer vacation (highway, a "cottage-like" house, a boat), which, as alluded to, could have been upper-most in the minds of students during the

spring term as they looked forward to the end of the school year. However, in terms of

the whole set of images, only a minority rated that they could be formed into a story.

Results of post-task items asked of all participants. Three items in the post-task

questionnaire were asked of all participants in the study. The first item asked students to

rate how frequently they thought about, depending on the task condition, either the

coincidence they described or the memories they wrote down in the image association

task. Table 51 (below) shows the frequency distribution of the ratings for this item.

Table 51

Ratings of how frequently participants think about memories

Rating		n	%	cum %
1 ("never")		11	3.0	3.0
2		58	16.0	19.0
3		71	19.6	38.6
4		67	18.5	57.0
5		84	23.1	80.2
6		47	12.9	93.1
7 ("frequently")		25	6.9	100.0
	total	363		

The mean rating for this item was 4.09 ($SD = 1.57$), and as shown in Table 51, the

distribution of ratings is fairly symmetrical, with approximately equivalent numbers of

students rating on either side of the graphic midpoint of the scale.

Table 52 (below) shows the distributions of responses to the question about how

frequently the participants think, in general, about the role of chance and coincidence in

their lives. The mean rating for this question is 3.88 (*SD* = 1.56), and the distribution of

scores is fairly symmetrical around the scale midpoint.

Table 52

Ratings of how frequently participants think about the role of chance in their lives

Rating		*n*	%	cum %
1 ("never")		20	5.5	5.5
2		58	15.9	21.4
3		78	21.4	42.9
4		75	20.6	63.5
5		70	19.2	82.7
6		48	13.2	95.9
7 ("frequently")		15	4.1	100.0
	total	364		

The final question on the post-task questionnaire asked students to rate the effect,

if any, that doing the emplotment task had on how they now think about their memories.

The distribution of ratings is shown below in Table 53. The mean rating for this item was

3.01 (*SD* = 1.62), and the distribution of scores shows that most of the participants felt

that the task did not have much of an effect on changing the way they thought about the

memories they described in the emplotment task. Only about 20% gave ratings > 4 on the

scale, and only nine participants (2.5%) rated the effect at the top of the scale (i.e., "big

effect on my thinking").

Table 53

Ratings of immediate task effects on thinking

Rating		n	%	cum %
1 ("no effect on my thinking")		85	23.4	23.4
2		76	20.9	44.2
3		58	15.9	60.2
4		73	20.1	80.2
5		50	13.7	94.0
6		13	3.6	97.5
7 ("big effect on my thinking")		9	2.5	100.0
	total	364		

Intercorrelations of scaled post-task items. Table 54 (below) shows the intercorrelations between the scaled items in the post-task questionnaire. Of particular interest for the question of task effects is that self-rated changes in thinking about the described memories were correlated with preexisting tendencies to think about the events and the strangeness and impact of the events.

Table 54

Intercorrelations of scaled post-task items

Item	1	2	3	4	5	6	7
1. number of events	-	.08	.09	.12*	.11	.15*	.01
2. strangeness of events		-	.15*	.00	.23***	.26***	.16**
3. impact of events			-	.27***	.59***	.26***	.18**
4. how positive were events				-	.22**	.06	.10
5. how often think about events					-	.34***	.14**
6. how often think about role of chance in general						-	.22***
7. how much did task affect thinking							-

* $p < .05$, ** $p < .01$, *** $p < .001$

<u>Differences between conditions.</u> To test for differences on the last item of the post-task questionnaire (i.e., participants' perceptions of change-in-thought regarding their memories as a result of the emplotment task), a one-way ANOVA was computed using task condition[69] as the IV and change-in-thought ratings as the DV. The F test was not significant, (F[5, 358] = 1.123, p = .348); and it was concluded that there were no significant differences in change-in-thought ratings between the six different experimental groups.

The 6-group IV was then collapsed into a three-level IV on the basis of type of task. Those who did the image task (whether freely or not) were defined as one level of the IV. Those who did the written task (whether freely or not) were defined as the second level of the IV. Finally, those who did *both* the image and the written task together (whether freely or not) were defined as the third level of the IV. Using this new group variable, a second ANOVA was performed on change-in-thought ratings. Again, the F test was not significant, (F[2, 361] = 0.740, p = .478); and it was concluded that task type did not result in any differences in change-of-thought ratings between the three groups.

Finally, the original 6-group task condition variable was redefined on the basis of whether or not the task was free form or controlled. Those who did the emplotment task in a free form manner (either image task or written task) were defined as one level of the IV, and those who did the controlled version of the task (either image or written) were defined as the other level of the IV. Using this new 2-group variable, a third ANOVA was computed on change-in-thought ratings. Again, the F test was not significant, (F[1, 362]

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The six task conditions were (a) image-only free-form, (b) write-only free-form, (c) image + written free-form, (d) image-only controlled, (e) write-only controlled, and (f) image + write controlled.

$= 0.070, p = .792$), and it was concluded that whether or not the task was done freely was

not associated with any between-groups differences in change-in-thought ratings.

<u>Phase III Follow-up Differences</u>

In the third phase of the study, all six experimental task groups plus a prepost-only

group completed a follow-up questionnaire several weeks after Phase II data collection.

The follow-up questionnaire contained a re-measure of the Narrative Emplotment Scale

and a re-measure of the Life Attitude Profile. In addition to this, a new section was

included that asked participants to rate the amount of change and direction of change they

had experienced in the last several months on 19 different "aspects and experiences of

life." These items were rated on a scale of 1 to 7 (1 = "much less," to 4 = "no change" to

7 = "much more"). The items (see Appendix XVI for complete item list) were designed

to reflect the constructs measured by the lengthier questionnaires used in Phase I of the

study.

A principal components analysis of the 19 new items revealed five factors that

accounted for 59.32% of the scale variance. These five factors were interpreted as (a)

"<u>Life Motivation</u>" (32.37% of variance; e.g., optimism, life-in-control, sense of potential,

connectedness to others, etc.), (b) "<u>Open Perception</u>" (9.24% of variance; e.g., tolerance

of uncertainty, feelings that life makes sense, etc.), (c) "<u>Tension</u>" (6.37% of variance; e.g.,

feelings of tension & stress), (d) "<u>Mystery</u>" (6.05% of variance; e.g., feelings of mystery in

life), and (e) "<u>Adventure</u>"(5.29% of variance; e.g., reduced boredom, sense of adventure

in life). Based on the PCA, the items loading in each factor were summed to create 5 new

sub-scales. Internal reliability analyses showed the following Cronbach's Alphas: Life

Motivation sub-scale, 9-items, $\alpha = .85$; Open Perception sub-scale, 4-items, $\alpha = .68$;

Tension sub-scale, 2-items, $\alpha = .77$; Mystery subscale, 2-items, $\alpha = .42$; and Adventure

sub-scale, 2-items, $\alpha = .47$[70]. These five new sub-scales were used in the follow-up

analysis.

Change-in-thought correlations with follow-up measures. Correlations were run

between scores on the post-task "change-in-thought" item and the follow-up questionnaire

measures. These are presented below in Table 55.

Table 55

Correlations between change-in-thought and follow-up measures

		partial r controlling for	
change-in-thought with	Zero-order	DC	Ambig. Tol.
Narrative Emplotment (NES)	.178**	.163**	.189***
Personal Meaning Index (PMI)	.002	.019	-.004
Life Motivation	.173**	.197***	.209***
Open Perception	.085	.090	.103
Tension	-.024	.004	.009
Mystery	.062	.088	.107
Adventure	.027	.057	.053

$* p < .05, ** p < .01, *** p < .001$

Change-in-thought ratings in the post-task questionnaire in Phase II correlated

with the narrative emplotment (NES) re-measure in Phase III and with the new Life

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Although the Cronbach Alphas for the last two sub-scales are in the range typically regarded as
unacceptably low, for two-item measures these values are quite respectable given that alpha varies as
a direct function of the number of items in a scale, and are conservative estimates that represent the
lower bound of the correlation if it was measured without error.

Motivation scale, but were uncorrelated with scores on the Personal Meaning Index re-measure or any of the other new follow-up scales.

Because the NES and the PMI had been measured in Phase I, within-groups dependent t-tests were run using for each of the six experimental groups and the prepost-only control group using NES and PMI as the DVs. For NES score differences, all experimental groups *and* the prepost-only group showed slight declines in NES scores. At the Bonferroni corrected critical alpha of $p < .007$, however, declines in scoring relative to scores in Phase I were significant (i.e., $< .007$) only for those in the "free form" conditions. For score differences on the PMI between Phase I and Phase III, there was no systematic change in scores either upwards or downwards, and none of the differences were significant, not even at a conventional .05 level.

Finally, a third set of between-groups one-way ANOVAs were computed on the follow-up measures. These analyses allowed for comparisons to be made between the experimental groups to the prepost-only group as well as between the different experimental groups themselves. First, the comparisons were run on narrative emplotment scores, using the 7-level experimental condition variable as the IV. The omnibus F-test was nonsignificant, $F(6, 359) = 1.57, p = .156$. Next, the same analysis was done, except that the 7-level IV was replaced with a 4-level IV "collapsed" over task (image only, written only, image + written, and prepost no-task group). Again, the F-test was nonsignificant, $F(3, 362) = 0.756, p = .520$. Thirdly, the analysis was done replacing the IV with a 3-level IV "collapsed" over the form of the task (free-form, constrained-form, and no-task prepost-only groups). In this case, the F-test was significant, $F(2, 363) = 3.385, p = .035$. Tukey HSD post-hoc t-tests were performed to identify the source of the

significance. The difference was found in the comparison between those in the free-form condition versus those in the constrained conditions. Those in the constrained condition had slightly lower scores on the Phase III measure of emplotment ($M = 33.38$, $SD = 8.43$) than those in the free-form conditions ($M = 35.96$, $SD = 9.67$), $t(326) = 2.57$, $p = .0104$. These results suggest some support for differential effects of the form of the task rather than the type of task, in which the constrained form may have "caused" a relative reduction in narrative emplotment compared to those who did either the writing task or the image-association task freely.

A parallel analysis was done for PMI scores measured in Phase III. None of the F-tests were significant, suggesting that neither the specific task condition, the type of task, nor the form of the task had any effects on PMI scores.

Lastly, the analysis was done on each of the new measures in the follow-up questionnaire. Omnibus F-tests were nonsignificant for Life Motivation, Open Perception, Adventure, and Tension in all of the analyses. For "Mystery" the F-test was significant in the analysis using the 7-level task condition IV, $F(6, 368) = 2.23$, $p = .040$. Post-hoc tests showed that this significance was due to an unusually high mean score in the write-only constrained group ($M = 9.54$, $SD = 1.92$) compared to the free-form writing group ($M = 8.59$, $SD = 1.59$), $t(112) = -2.89$, $p = .0046$. No explanation is offered for this finding other than, given the large number of comparisons done, it might be merely a chance effect. Analyses using the collapsed IVs revealed no significant differences.

Discussion of follow-up results. Overall, the results of the above analyses do not provide much evidence to suggest that doing the emplotment task in this study had any substantial effects on narrative emplotment, personal meaning, or general experiential

variables created for the follow-up questionnaire. In the Phase II post-task questionnaire, most of the participants indicated that doing the task did not cause them to think very much differently about the memories that they had worked with in the various tasks, although a minority did indicate some change in their thoughts. However, there were no variations in change-in-thought that could be attributed to the type or form of task that the students did.

Nonetheless, there was some faint evidence that those who reported a change-in-thought in Phase II of the study may have also had slightly increased scores on Narrative Emplotment Scale scores and Life Motivation scores in the Phase III follow-up. The within-groups paired *t*-tests, however, showed that emplotment scores slightly declined in *all* groups from Phase I to Phase III, but that the declines were significant only for those in the three "free-form" conditions. To *speculate*, it may have been the case that "constrained" form of the tasks did not engage students to the same extent that the free-form did, and left their existing conceptions intact, whereas the free-form tasks may have instigated some instability in their conceptions of the role of chance in their personal histories and thus the slightly reduced scores on the NES measure.

The within-groups analyses, however, were done separately for each group, and thus precluded between-groups comparisons. Between-groups ANOVAs were done, and no differences in the follow-up measures were found using the 7-level IV, or the 4-level "collapsed across task" IV. When the group IV was collapsed across form, however, there was some indication that those in the *constrained* groups had slightly lower scores on Narrative Emplotment Scale (NES) scores than those in the "free-form" conditions. This result is opposite of the results of the within-groups paired *t*-tests on NES, but may

be more reliable given that it was based on larger cells sizes as a result of collapsing the independent variable. If this interpretation is plausible and correct, then it might suggest that the form of the tasks (rather than the type of task) may have had some small delayed effects on the cognitive processes underlying the responses to the NES.

When all is said and done, however, the few effects that were found could be spurious artifacts related to the number of individual tests done. To properly determine any causal effects that occurred as a consequence of doing the emplotment tasks in Phase II of the study, one would have to conduct a different kind of analysis. One approach might be more fine-grained, so to speak, and take a "single-n" approach to the analysis of extreme cases or cases in which change over time was most obvious. Alternatively, a broader "big picture" approach could be taken and the entire dataset could be subject to SEM analysis, which can effectively eliminate all measurement error in modelling causal sequences.

IV. Additional Analysis: Predictors of Personal Meaning

A final set of unhypothesized exploratory regressions were conducted in order to gain a "global view" of the relative contribution of the predictor variables measured at the beginning of the study to scores on the Personal Meaning Index of the Life Attitude Profile collected 6-8 weeks later at the conclusion of the study. By casting the analysis as longitudinal, this approach allows for some semblance, however minimal or simplistic, of a crude "causal" model relating the predictors to the criterion. To do this, three types of regressions (multiple, stepwise, and sequential) were computed regressing Personal Meaning Index (PMI) scores collected during Phase III on Phase I covariates – narcissism (NPI) and perceived stress (PS), the two personality variables of primary interest -- desire for control (DC) and ambiguity tolerance (MSTAT), and the three emplotment measures -

- narrative emplotment (NES), possible lives (PLQ), and transpersonal interpretations of

chance (CCQ_TRN). Table 56 (below) shows the results of these regressions.

Table 56

Regression of Phase III Personal Meaning Index scores on Phase I predictors.

Predictor	Multiple β	Stepwise β	Sequential β Step 1	β Step 2	β Step 3
Stress	-.206***	-.199***	-.160**	-.150**	-.206***
Narcissism	-.019	-.013	.076	-.015	-.019
Ambiguity Tolerance	-.059	-.051	-	-.035	-.059
Desire for Control	.148*	.147**	-	.197**	.148*
CCQ_Transpersonal	.143*	.172**	-	-	.143*
Possible Lives	.081	.070	-	-	.081
Narrative Emplotment	.243***	.239***	-	-	.243***
Multiple R =	.441	.434	.180	.243	.441
Model R² =	.195	.188	.033 ->	.059 ->	.195

* $p < .05$, ** $p < .01$, *** $p < .001$

All three regressions produce equivalent end results, but of particular interest is the

sequential regression. The two covariates were entered first in Step 1, and only stress

measured at the beginning of the study predicted PMI scores 6-8 weeks later at the end of

the study. However, only about 3% of the variance of PMI was predicted by this model.

The two central IV measures of the study -- ambiguity tolerance and desire for control

were entered into the model in Step 2. In this model, only desire for control was a

significant longitudinal predictor of PMI, and while the β for stress decreased slightly from

the first model, it remained significant. Total model R^2 in Step 2 increased to about 6%.

Finally, in Step 3, transpersonal interpretations of chance (CCQ), possible lives (PLQ), and narrative emplotment (NES) scores were added to the model. Transpersonal interpretations of chance and narrative emplotment were both significant predictors in this model, but PLQ scores were not. Previously significant predictors remained so. What is particularly striking about the third model is the substantial increase in total explained variance that is added to the model by the inclusion of CCQ and emplotment as predictors of personal meaning (PMI)— which increases from about 6% in the second model to almost 20% in the third model, which is well within the range of R^2 that is conventionally regarded as having meaningful explanatory and predictive power in psychological research.

The longitudinal character of this analysis allows a provisional statement to be made about the role of the variables in the ongoing support or maintenance of personal meaning. Clearly, among the set of variables in this analysis, the narrative emplotment of chance stood out as the most significant positive predictor of subsequent PMI scores. The PMI is a composite measure comprised of two sub-dimensions of the Life Attitude Profile -- a sense of *purpose* dimension and a sense of *coherence* dimension. According to Reker (1996), the *purpose* dimension measures "having goals, having a mission in life, having a sense of direction from the past, in the present, and toward the future" (p. 14). The *coherence* dimension measures the extent to which an individual has a "logically integrated and consistent analytical and intuitive understanding of self, others, and life in general....a sense of order and reason for existence, [and] a clear sense of personal identity" (p. 15). From a narrative perspective, these two dimensions of the Personal Meaning Index together suggest the elements or ingredients of a "story" (i.e., goals, mission, sense of

direction, sense of order and reason for existence), and as such, it makes perfect sense that the tendency to emplot chance events (i.e., to make them part of the "plot" of one's life by giving them self-relevant order and meaning) should be positively associated with Reker's constellation of purpose and coherence. Further, the results suggest that desire for control provides an additional motivational incentive for the desirability and formulation of goals, direction, and the sense of order inherent in creation and sustaining of personal meaning. The third positive predictor of PMI was the transpersonal interpretation of chance (i.e., perceptions of chance as involving a spiritual or transpersonal dimension or invoking spiritual or transpersonal experience). Although not using explicitly spiritual terminology in the scale, the coherence subscale of the PMI contains several items which implicitly allude to qualities of experience that are perceived as being not entirely subjective and "beyond" the person (e.g., "the meaning of life is evident in the world around us," or "I have a clear understanding of the ultimate meaning of life"). Again, it makes conceptual sense that transpersonal interpretations of chance events would facilitate perceptions of non-subjective meaning. Finally, though, stress was found to be negatively associated with PMI. In the context of the longitudinal analysis, this suggests that stress could mediate or attenuate the positive effects on PMI of emplotment, desire for control, and transpersonal interpretations of chance.

CONCLUDING COMMENTS AND AFTERTHOUGHTS

I began this thesis by suggesting that what both science and "ordinary people" have *in common* is that they both necessarily eliminate some of the facts of history and experience in order to maximize the coherence of their historical or narrative self-identities, but that where they *differ* is in how they engage the "facticity" of chance events. Whereas science generally attempts to exclude or control the influence of chance in its attempt to maximize the coherence of its enterprise, individuals can and do "make a place" for chance events in their lives by interpretively controlling the self-relevant meanings that these events can have in the unfolding of their lives. Borrowing the term from Ricouer (1992) with little change to its essential meaning as "chance...transmuted into fate" (p. 147), I called this process "narrative emplotment" and characterized it as a specific instance of what Rothbaum, Weisz, and Snyder (1982) more generally referred to as secondary interpretive control.

Further, I suggested that with only several exceptions, the role of chance events in the unfolding of human lives has been all but ignored by both traditional empirical social science as well as by the more "postmodern" narrativist schools. One reason that I offered for this was that both paradigms arose out of a common culture in which agency is held, and perhaps, as Bakan (1966) suggested, even idolized, as a core value. Thus, chance events are a kind of "curse" to both paradigms to the extent that they threaten the ideals of self-determination in the former and notions of "authorship" and "empowerment" in the latter. With this "state of affairs" as the background of my thinking, one of my underlying aims in this thesis was an attempt, so to speak, to "live with a foot in each world," by applying "traditional science" methods to the exploration of "narrativist" subject matter

(i.e., emplotment) while allowing a "narrativist" frame of concern[71] to shape my use of "traditional science" methods.[72]

As previously noted (footnote 9, p. 6), I did not, in this thesis, take either of the two reductionist paths that have been predominantly used in approaching the subject of chance, although I could have. For example, I could have, had I the technical resources, taken the upwardly-reductionistic "parapsychology/quantum physics/chaos theory" route in an attempt to somehow objectify, measure, and validate the synchronistic model of chance. Or, I could have gone in the other direction and concocted some kind of judgement-of-probability experiment to downwardly-reduce the experience of meaningful coincidence to nothing more than a flaw or error in human statistical reasoning potentially indicative of irrational or delusory thinking. The "problem" that I would have had with either approach, however, is that both are, from my point of view, removed or detached from everyday experience. People do not ordinarily experience themselves as epiphenomenal distillates squeezed out of the unity of time, space, matter, and energy (the upward reduction of quantum physics in the former case); nor, in the downward-reduction case, do they experience themselves as nothing more than fleshy calculating machines. Rather, people live in a world of goals and values, personal meanings and motivations, and

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By the term narrativist "frame of concern," I mean to refer in general to the postmodern stance or attitude in which there is a "renewed relevance...[of] all that modernity has set aside" (Rosenau, 1992, p. 6), such as the importance of emotions, feelings, and intuitions; phenomenology, personal experience and personal meaning, myth and story, spirituality, mystical experience, etc.

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I believe that I have been partially successful in this respect. A passerby at a conference poster session several years ago made a comment on some other emplotment data I presented that my research was, in terms of its epistemological appeal, a "trojan horse inside a trojan horse." I took this comment as a compliment.

so on, where chance events can have what I would call an "equal rank" in the explanatory

schemas of individual lives; and in this respect, I agree with Vallacher (1998) that

"everyday narratives may make better contact with reality than do conventional social

sciences accounts with respect to the meaning of chance in people's lives" (p. 112).

However, I do not agree that conventional social science cannot have anything to say

about the role of chance in peoples' lives and certainly disagree with the statement that

"coincidences need no special explanation" (Stanovich, 2001, p. 179). As perceptual

events occurring in the context of a social world, chance events and coincidences can

have, depending on their construal by the percipient, important implications for a wide

variety of human concerns. For instance, in the current study, a tally of the types of

coincidence narratives showed that the most frequent coincidence story concerned the

chance meeting of future friendships, particularly romantic friendships. Although the

analysis of the content of the coincidence stories was not part of the formal research aims

of this study, this descriptive result by itself could prompt further questions in the study of

relationship formation. For instance, given the frequent attributions to "fate" or

"transpersonal intervention," relationship researchers could ask whether or not

relationships formed in this way are regarded, valued, or committed to any differently than

relationships formed by non-chance meetings. Surely, any unique meaningfulness attached

to a chance encounter that leads to a romance cannot be convincingly "explained away" as

an error in statistical reasoning (certainly not to those in love, at any rate). In academic

relationships, as Bandura (1982) illustrated, the chance meeting of an inspiring professor

could change a student's life, perhaps triggering a life-long commitment to study in an

area previously unsuspected by the student as being of any potential interest.

Motivationally, the construal of chance events also has important impacts. Do chance events lead to feelings of helplessness and loss of control? Or, if given self-relevant meaning, can they support motivation? For my part, I suggest the latter. In a small study unrelated to this thesis (Hladkyj, Taylor, Pelletier, & Perry, 1999), it was found that university students who scored high on the Narrative Emplotment Scale (NES) at the beginning of the academic year maintained their levels of intrinsic academic motivation across the school year, whereas those who scored low on the NES finished the school year with a net motivational deficit. Similar scenarios could be constructed for other dimensions of human experience as well (e.g., health, career development, etc.) but the important point here is that the human experience of meaningful coincidence occurs and has impact in the real social world, rather than in the intangible worlds of microphysics, chaos theory, or statistical probability. Because of this conviction, I chose in this thesis to try to understand, even if in a very limited way, some of the psychodynamics of the emplotment of chance at the subjective human level.

If there is a single set of findings that may be of some external value and relevance to social and personality psychology, these are the findings associated with the Desire for Control (DC). In introducing the construct and drawing a distinction between Rothbaum, et al's (1982) notions of *primary* and *secondary* control, Burger (1992) conceived of DC as "based on a definition of control in terms of direct action and choices....[the] motivation to engage in primary control rather than [to] rely on secondary control procedures" (p. 8). The current study, however, shows that DC is implicated in the *interpretive control of the meanings* of events over which objective control was either never, or has since ceased to be, possible (i.e., past chance events, accidents, etc), and as such, DC is empirically

relevant to Rothbaum, et al's (1982) secondary control construct. Further, the results show that this extended range or domain of events in which the desire for control operates as a dispositional motivation includes such "intangible" higher-order self-perceptions as an individual's sense of purpose and meaning in life (as measured by the PMI). The expansion of the scope of DC to the include the control of the *meaning* of non-controllable events as well as objectively controllable ones (or ones believed to be controllable) is of more than just theoretical interest, and has practical implications for research as well. By way of a negative example, a cursory Boolean search of the APA's PsycInfo database shows 128 returns for the search term "desire for control." Similarly, the term "sense of coherence" returns 362 entries, "personal meaning" returns 382, and "purpose in life" returns 71 entries. However, when either of these three latter search terms is used in conjunction with the phrase "desire for control" the number of matches reduces to *exactly zero*. Admittedly, this is a crude assessment, but to the extent that the APA database is an accurate reflection of the "state of the art" it suggests that the exploration of the role played by the desire for control in the more sublime realms of human experience and well-being remains an open field for further inquiry.

A second potentially relevant contribution made by this study concerns ambiguity tolerance, and specifically, its relationship to the desire for control. Based on previous literature, I had construed ambiguity tolerance to be incompatible with the desire for control insofar as ambiguity would constitute a threat to perceptions of control for some individuals. Quite the opposite was found, and in fact, desire for control (DC) and ambiguity tolerance (MSTAT) were among the most highly correlated variables in the study ($r = .45$). The suggestion was made that apart from some conceptual overlap

between MSTAT and DC, the nature of the bi-directional relationship was such that the tolerance of ambiguity would "admit" (rather than exclude) more events into the stream of experience over which the desire for control could be exerted; and, in kind, DC would provide the motivation for the enlargement of ambiguity tolerance.

The broad general finding in this study was that both desire for control and ambiguity tolerance were found to be positively related to the emplotment of chance and to scores on the Personal Meaning Index. The question could be asked, "So what?" "Who cares?" Or "What does it matter in the bigger picture?" I have asked myself these questions and answer myself with the reminder that the "problem" of chance and coincidence in peoples' lives will not simply go away because psychology is disinterested. The human need for meaning will always exist (Frankl, 1978, 1984), and people will creatively construct their meanings using any means that are available to them, whether psychology "approves" of their methods or not. As stated in the introduction to this study, one important way that I believe people construct their personal meanings is through the emplotment of chance, through which the vicissitudes of unpredictable unchosen experience are interpreted in such a way as to give these events meaning and value in the narrative structure and coherence of their lives.

This, I think, is particularly important, given the accelerated rate of social change in the world, in which the traditional sources of self-identity and life coherence and purpose "handed down," so to speak, from history and culture are becoming less tenable. Social change brings about instability, unpredictability, and a level of uncertainty which can threaten the individual's perceptions of "being in control" of his or her life. Part of this sense of control, I maintain, comes from the creative capacity of the individual to

emplot the unchosen contingencies of existence as meaningful and self-relevant linkages between the self and the social world in which the self lives. If human meaning is to be valued as a legitimate subject for psychological inquiry, then psychologists need to avoid prematurely and cynically disregarding the "problem" of chance and meaningful coincidence by reducing it to errors in statistical reasoning or irrational "magical thinking." Rather, a more "optimistic"or salutary psychology should seek to understand the positive role played in human life by the experience and effects of "meaningful coincidence" and the psychological processes that underlie them.

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Appendix I

Desirability of Control scale

Instructions: Below you will find a series of statements. Please read each statement carefully and respond to it by expressing the extent to which you believe the statement applies to you. For all items, a response of 1 to 7 is required. Use the number that best reflects your belief when the scale is defined as follows:

> 1 = The statement does not apply to me at all.
> 2 = The statement usually does not apply to me.
> 3 = Most often, the statement does not apply.
> 4 = I am unsure about whether or not the statement applies to me, or it applies to me about half the time.
> 5 = The statement applies more often than not.
> 6 = The statement usually applies to me.
> 7 = The statement always applies to me.

1.   I prefer a job where I have a lot of control over what I do and when I do it.

2.   I enjoy political participation because I want to have as much of a say in running government as possible.

3.   I try to avoid situations where someone else tells me what to do.

4.   I would prefer to be a leader rather than a follower.

5.   I enjoy being able to influence the actions of others.

6.   I am careful to check everything on an automobile before I leave on a long trip.

7.*   Others usually know what is best for me.

8.   I enjoy making my own decisions.

9.   I enjoy having control over my own destiny.

10.*   I would rather someone else take over the leadership role when I'm involved in a group project.

11.   I consider myself to be generally more capable of handling situations than others are.

12.   I'd rather run my own business and make my own mistakes than listen to someone

else's orders.

13. I like to get a good description of what a job is all about before I begin.

14. When I see a problem, I prefer to do something about it rather than sit by and let it continue.

15. When it comes to orders, I would rather give them than receive them.

16.* I wish I could push many of life's daily decisions off on someone else.

17. When driving, I try to avoid putting myself in a situation where I could be hurt by another person's mistake.

18. I prefer to avoid situations where someone else has to tell me what it is that I should be doing.

19.* There are many situations in which I would prefer only one choice rather than having to make a decision.

20.* I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered with it.

* starred items are reverse coded for summation to the total score

Appendix II

Tolerance of ambiguity (MSTAT)

Strongly   Strongly
Disagree   Agree

1   2   3   4   5   6   7

1.*   I don't tolerate ambiguous situations well.

2.*   I find it difficult to respond when faced with an unexpected event.

3.   I don't think new situations are any more threatening than familiar situations.

4.   I'm drawn to situations which can be interpreted in more than one way.

5.*   I would rather avoid solving a problem that must be viewed from several different perspectives.

6.*   I try to avoid situations which are ambiguous.

7.   I am good at managing unpredictable situations.

8.*   I prefer familiar situations to new ones.

9.*   Problems which cannot be considered from just one point of view are a little threatening.

10.*   I avoid situations which are too complicated for me to understand.

11.   I am tolerant of ambiguous situations.

12.   I enjoy tackling problems which are complex enough to be ambiguous.

13.*   I try to avoid problems which don't seem to have only one "best" solution.

14.   I often find myself looking for something new, rather than trying to hold things constant in my life.

15.   I generally prefer novelty over familiarity.

16.*   I dislike ambiguous situations.

17.   Some problems are so complex that just trying to understand them is fun.

18.   I have little trouble coping with unexpected events.

19.   I pursue problem situations which are so complex some people call them "mind boggling."

20.*   I find it hard to make a choice when the outcome is uncertain.

21.   I enjoy an occasional surprise.

22.   I prefer a situation in which there is some ambiguity.

* starred items are reverse coded before summation to the total score

Appendix III

<u>The Narrative Emplotment Scale</u>

Instructions: The following eight questions ask you to reflect on your experience of living. Please answer each question by choosing a number on the 7-point scale, where 1 = not at all like you, to 7 = very much like you.

| NOT AT ALL | | VERY MUCH |
| LIKE ME | | LIKE ME |

1   2   3   4   5   6   7

1.   I often experience my life as if it were unfolding like a movie or a play.

2.   I often get a "deep down" feeling that I know how the rest of my life is going to go, even though I don't know the details.

3.   When I look back on my life so far, all of the things that have happened, both good and bad, all fit together in a way that makes sense to me.

4.   Coincidences that I have experienced often seem to have a kind of strange or mysterious personal meaning for me.

5.   When bad things happen to me, I make an intentional effort to understand how they fit into the rest of my life.

6.   Random events and chance happenings often seem to me to be like "hints" or "clues" for me to understand both who I am and my life as a whole.

7.   Based on my experience, negative events that I would not have chosen for myself in the end have made me a different person.

8.   I often have a strange feeling that some things that have happened to me have happened for a reason, as if they were supposed to happen.

Appendix IV

<u>The Possible Lives Questionnaire</u>

Instructions: This questionnaire asks you to reflect on possibilities that could happen in
your life. A short list of these possibilities is presented below, and you are asked to try to
imagine them as real possibilities in your life.

Use the following scale, where

         1 = very difficult to imagine
         2 = somewhat difficult to imagine
         3 = slightly difficult to imagine
         4 = "about 50/50"
         5 = slightly easy to imagine
         6 = somewhat easy to imagine
         7 = very easy to imagine

Taking into consideration everything that you know about yourself, the kind of person you
are, your goals and values, and in general how you see your life turning out, how easy is it
for you to <u>realistically imagine yourself</u>...

1.   getting married?

2.   becoming an alcoholic or drug abuser?

3.   getting a good paying job soon after graduating?

4.   getting killed in an accident?

5.   becoming actively involved in social & political movements?

6.   leading a life of travel and adventure in foreign lands?

7.   becoming a small business owner, making a decent living?

8.   making religion the centre of your life?

Appendix V

<u>Chance and Coincidence Questionnaire</u>

Using the 7-point scale, read each statement below, and then rate yourself on a scale from 1 to 7

NOT AT ALL TRUE OF MYSELF OR MY EXPERIENCE		NEITHER TRUE NOR FALSE, OR UNCERTAIN		COMPLETELY TRUE OF MYSELF OR MY EXPERIENCE	
1	2	3	4	5	6	7

1. I have had experiences in which a dream or a thought or a daydream image later came true in reality.

2. I believe that all of the coincidences that happen to me are caused by nothing more than blind chance.

3. I have had experiences of chance and coincidences that left me with the feeling that God or some higher power had something to do with it.

4. I have had experiences of chance events and coincidences that I realized were just the product of my own imagination and nothing more.

5. Chance events and coincidences have sometimes helped me understand something important about myself.

6. Chance events and coincidences in my life have resulted in me having a more spiritual or religious outlook on life.

7. Chance events and coincidences have given me a greater sense or feeling that my life has a purpose of some kind.

8. Chance events and coincidences that I have experienced have given me the feeling that my life has a kind of "plan" or "story" to it, even if I don't know exactly what the plan or story is.

9. Chance meetings in my life have led to important friendships.

10. Chance meetings in my life have often led to romantic relationship(s).

11. I have had experience(s) in which a message intended for me reached me totally by coincidence and which might not have reached me in any other way except by coincidence.

12. I have sometimes caught myself noticing over and over certain meaningless things which I have no reason to notice (e.g., green triangles, pictures of fish everywhere I go, people wearing red hats, etc.).

13. I have had experience in which I had a strange feeling that something was going to happen, and then later it really did happen.

14. When coincidences happen to me, they are nothing more than just that - just chance events and nothing else.

15. When a chance event or encounter suggests an answer to a personal question or difficulty, I believe that a divine intelligence provides this guidance.

16. My experiences of meaningful coincidences have given me a sense that a divine being is looking after me.

17. I have had experiences of chance events or coincidences that I realized were a product of my own preoccupations and concerns at the time.

18. I have been frequently assisted in solving "life's little problems" by the occurrence of a chance event or a coincidence.

19. I have often achieved my desires because of a chance event or a coincidence.

20. Chance events and coincidences have often opened new doors of opportunity to me.

21. Chance events have allowed me to experience greater spiritual feelings in my life.

22. Meaningful coincidences have given me a sense of meaning and purpose in the world.

23. Chance events and coincidences often feel like "clues" to something going on in my life that I am supposed to figure out.

24. Events which seemed to be unlikely coincidences at the time have significantly determined the course of my life.

25. I have met my best friends through chance events and coincidences.

26. My most important romantic relationship(s) started with a chance meeting.

27. In my life I have noticed that certain kinds of chance events tend to happen together in "clumps" or "clusters."

28.   I have often seen something on TV, or in a magazine, or on a billboard, or heard something on the radio that matched something I had been thinking about just a short time earlier.

29.   I sometimes notice similar things in different places on the same day which I have no reason to notice, but do notice, even though I don't know why I am noticing them.

30.   I have had dreams that later actually happen in my waking life.

31.   I have had an experience in which I suddenly get a feeling that I know that something is happening at a different location than where I am, and then later find out that the event happened at the exact same time I had the feeling.

32.   It is at the times when I am stuck, not knowing what to do, that coincidences seem to provide answers.

33.   I have had experience of chance events in which I realized that the meaning I saw in them was just due to my own wishful thinking.

34.   Over the course of my life, I have noticed series of chance events occurring over and over again.

35.   I have often noticed chance events that seem to repeat themselves in "patterns" over a period of time.

Appendix VI

<u>Life Attitude Profile</u>

This questionnaire contains a number of statements related to opinions and feelings about yourself and life in general. Read each statement carefully, then indicate the extent to which you agree or disagree by circling one of the alternative categories provided. For example, if you strongly agree, circle SA following the statement. If you moderately agree, circle MD. If you are undecided, circle U. Try to use the undecided category sparingly.

1	2	3	4	5	6	7
SD	D	MD	U	MA	A	SA
Strongly Disagree	Disagree	Moderately Disagree	Undecided	Moderately Agree	Agree	Strongly Agree

1. My past achievements have given my life meaning and purpose.

2. In my life I have very clear goals and aims.

3. I regard the opportunity to direct my life as very important.

4. I seem to change my main objectives in life.

5. I have discovered a satisfying life purpose.

6. I feel that some element which I can't quite define is missing in my life.

7. The meaning of life is evident in the world around us.

8. I think I am generally much less concerned about death than those around me.

9. I feel the lack of and need to find a real meaning and purpose in my life.

10. New and different things appeal to me.

11. My accomplishments in life are largely determined by my own efforts.

12. I have been aware of an all powerful and consuming purpose towards which my life has been directed.

13. I try new activities or areas of interest and then these soon lose their attractiveness.

14. I would enjoy breaking loose from the routine of life.

15. Death makes little difference to me one way or the other.

16. I have a philosophy of life that gives my existence significance.

17. I determine what happens in my life.

18. Basically, I am living the kind of life I want to live.

19. Concerning my freedom to make my choice, I believe I am absolutely free to make all life choices.

20. I have experienced the feeling that while I am destined to accomplish something important, I cannot put my finger on just what it is.

21. I am restless.

22. Even though death awaits me, I am not concerned about it.

23. It is possible for me to live my life in terms of what I want to do.

24. I feel the need for adventure and "new worlds to conquer."

25. I would neither fear death nor welcome it.

26. I know where my life is going in the future.

27. In thinking of my life, I see a reason for my being here.

28. Since death is a natural aspect of life, there is no sense worrying about it.

29. I have a framework that allows me to understand or make sense of my life.

30. My life is in my hands and I am in control of it.

31. In achieving life's goals, I have felt completely fulfilled.

32. Some people are very frightened of death, but I am not.

33. I daydream of finding a new place for my life and a new identity.

34. A new challenge in my life would appeal to me now.

35. I have a sense that parts of my life fit together into a unified pattern.

36.   I hope for something exciting in the future.

37.   I have a mission in life that gives me a sense of direction.

38.   I have a clear understanding of the ultimate meaning of life.

39.   When it comes to important life matters, I make my own decisions.

40.   I find myself withdrawing from life with an "I don't care" attitude.

41.   I am eager to get more out of life than I have so far.

42.   Life to me seems boring and uneventful.

43.   I am determined to achieve new goals in the future.

44.   The thought of death seldom enters my mind.

45.   I accept personal responsibility for the choices I have made in my life.

46.   My personal existence is orderly and coherent.

47.   I accept death as another life experience.

48.   My life is running over with exciting good things.

6 Dimensions of the LAP

alpha test-retest

alpha	test-retest		
.86	.87	Purpose (PU)	1+2+5+18+26+31+37+48
.82	.85	Coherence (CO)	7+12+16+27+29+35+38+46
.80	.77	Choice/Responsibility (CR)	3+11+17+19+23+30+39+45
.84	.84	Death Acceptance (DA)	8+15+22+25+28+32+44+47
.79	.83	Existential Vacuum (EV)	4+6+9+13+20+33+40+42
.80	.80	Goal Seeking (GS)	10+14+21+24+34+36+41+43

2 Composite Scales

alpha test/re-test

alpha	test/re-test		
.91	.90	Personal Meaning Index	PU + CO
.90	.90	Existential Transcendence	PU+CO+CR+DA - (EV+GS)

Appendix VII

Perceived Stress Scale

Instructions: The items below concern your feelings and thoughts about various things
that have happened in your life during the last month. In each case you are asked to
indicate how often you felt or thought a certain way.

Never	Infrequently	Sometimes	Frequently	Very Often
1	2	3	4	5

1. How often have you been upset because of something that happened
    unexpectedly?

2. How often have you felt that you were unable to control the important things in
    your life?

3. How often have you felt nervous or stressed?

4. How often have you found that you could not cope with all the things that you had
    to do?

5. How often have you been angered because of things that happened that were
    outside of your control?

6. How often have you found yourself thinking about things that you would have to
    accomplish?

7. How often have you felt difficulties piling up so high that you could not overcome
    them?

Appendix VIII

Narcissistic Personality Inventory

Directions: In each of the following pairs of attitudes, choose the one that you most agree with. Mark your answers by bubbling-in EITHER 1 or 2 (for either A or B) in the appropriate space on the bubble-sheet. Bubble in only ONE ANSWER for each attitude pair, and please try not to skip any items.

1. A. I have a natural talent for influencing people.
    B. I am no good at influencing people.

2. A. Modesty doesn't become me.
    B. I am essentially a modest person.

3. A. I would do almost anything on a dare.
    B. I tend to be a fairly cautious person.

4. A. When people compliment me I sometimes get embarrassed.
    B. I know that I am good because everybody keeps telling me so.

5. A. The thought of ruling the world frightens the hell out of me.
    B. If I ruled the world it would be a better place.

6. A. I can usually talk my way out of anything.
    B. I try to accept the consequences of my behaviour.

7. A. I prefer to blend in with the crowd.
    B. I like to be the centre of attention.

8. A. I will be a success.
    B. I am not too concerned about success.

9. A. I am no better or no worse than most people.
    B. I think I am a special person.

10. A. I am not sure if I would make a good leader.
    B. I see myself as a good leader.

11. A. I am assertive.
    B. I wish I were more assertive.

12. A. I like having authority over other people.
    B. I don't mind following orders.

13. A.   I find it easy to manipulate people.
    B.   I don't like it when I find myself manipulating people.

14. A.   I insist upon getting the respect that is due me.
    B.   I usually get the respect that I deserve.

15. A.   I don't particularly like to show off my body.
    B.   I like to show off my body.

16. A.   I can read people like a book.
    B.   People are sometimes hard to understand.

17. A.   If I feel competent I am willing to take responsibility for making decisions.
    B.   I like to take responsibility for making decisions.

18. A.   I just want to be reasonably happy.
    B.   I want to amount to something in the eyes of the world.

19. A.   My body is nothing special.
    B.   I like to look at my body.

20. A.   I try not to be a show-off.
    B.   I will usually show off if I get the chance.

21. A.   I always know what I am doing.
    B.   Sometimes I am not sure of what I am doing.

22. A.   I sometimes depend on people to get things done.
    B.   I rarely depend on anyone else to get things done.

23. A.   Sometimes I tell good stories.
    B.   Everybody likes to hear my stories.

24. A.   I expect a great deal from other people.
    B.   I like to do things for other people.

25. A.   I will never be satisfied until I get all that I deserve.
    B.   I take my satisfactions as they come.

26. A.   Compliments embarrass me.
    B.   I like to be complimented.

27. A.   I have a strong will to power.
    B.   Power for its own sake doesn't interest me.

28. A.   I don't care about new fads and fashions.
     B   I like to start new fads and fashions.

29. A   I like to look at myself in the mirror.
     B   I am not particularly interested in looking at myself in the mirror.

30. A   I really like to be the centre of attention.
     B   It makes me uncomfortable to be the centre of attention.

31. A   I can live my live in anyway I want to.
     B   People can't always live their lives in terms of what they want.

32. A   Being an authority doesn't mean that much to me.
     B   People always seem to recognize my authority.

33. A   I would prefer to be a leader.
     B   It makes little difference to me whether I am a leader or not.

34. A   I am going to be a great person.
     B   I hope I am going to be successful.

35. A   People sometimes believe what I tell them.
     B   I can make anybody believe anything I want them to.

36. A   I am a born leader.
     B   Leadership is a quality that takes a long time to develop.

37. A   I wish someone would someday write my biography.
     B   I don't like people to pry into my life for any reason.

38. A   I get upset when people don't notice how I look when I go out in public.
     B   I don't mind blending into the crowd when I go out in public.

39. A   I am more capable than other people.
     B   The is a lot I can learn from other people.

40. A   I am much like everybody else.
     B   I am an extraordinary person.

Appendix IX

Demographic information

1. What is your gender?
        1. male
        2. female

2. What is your age group?
        1. Less than 18
        2. 18 - 19
        3. 20 - 21
        4. 22 - 25
        5. 26 - 30
        6. 31 - 36
        7. 37 - 43
        8. 44 - 51
        9. 52 - 60
        10. 61 or older

3. What is your marital status?
        1. Single, never married
        2. In relationship, but not living together
        3. Common-law
        4. Married
        5. Separated
        6. Divorced
        7. Widowed

4. With which of the following ethnic/racial groups (defined by geographical location) do you most feel a shared ancestral self-identity? (Select one only)

        1. European/Caucasian descent ("white")
        2. Aboriginal North American
        3. East Indian
        4. Asian
        5. Polynesian
        6. Middle Eastern
        7. African
        8. Central American
        9. South American
        10. Australian

5. Which of the following best describes your own religion?

        1. Christian
        2. Buddhist
        3. Hindu

4. Islamic
5. Jewish
6. Traditional Native American
7. New Age Spirituality
8. Agnostic
9. No religion

Appendix X

Images Used in Emplotment Task

Appendix XI

List of 194 Rank-ordered Words

BOLDED words are words selected for stimuli

WORD	SALIENCE RATING	WORD	SALIENCE RATING	WORD	SALIENCE RATING
bed	18.36	horse	17.07	teacher	16.68
girl	18.23	**house**	17.06	elephant	16.67
milk	18.13	cigarette	17.03	flag	16.66
car	18.10	hand	17.02	bible	16.65
boat	18.00	gun	17.01	camera	16.65
woman	17.80	knife	17.01	coin	16.59
boy	17.77	violin	17.01	broom	16.55
wine	17.71	zoo	17.01	**dress**	16.54
man	17.62	eye	17.00	nurse	16.54
piano	17.58	tree	17.00	stove	16.53
dog	17.52	**sandal**	16.99	chipmunk	16.52
tomato	17.51	nose	16.99	chicken	16.52
book	17.51	rock	16.98	bee	16.51
pants	17.49	rose	16.96	crab	16.51
sun	17.47	cucumber	16.94	key	16.50
coffin	17.46	beetle	16.93	chair	16.47
money	17.45	glove	16.93	saxophone	16.42
deer	17.44	meat	16.92	football	16.41
bread	17.40	frog	16.91	squirrel	16.41
baby	17.38	**highway**	16.91	paper	16.40
grasshopper	17.35	tennis	16.90	baseball	16.37
lion	17.34	ear	16.89	window	16.36
telephone	17.31	pie	16.89	grave	16.35
bird	17.27	student	16.87	beer	16.35
kiss	17.21	necklace	16.86	**rabbit**	16.35
leg	17.20	alligator	16.85	beard	16.34
teeth	17.19	duck	16.84	dime	16.34
cow	17.17	lemon	16.83	hammer	16.33
banana	17.16	tongue	16.83	butterfly	16.33
apple	17.15	**clown**	16.78	typewriter	16.32
sailboat	17.15	shoe	16.76	hat	16.31
gorilla	17.13	fish	16.75	moose	16.30
snake	17.10	swimming	16.75	fence	16.29
feet	17.10	box	16.73		
flower	17.10	cheese	16.72		
church	17.09	sparrow	16.72		
cat	17.08	bell	16.70		
fingers	17.08	**mouth**	16.69		
cake	17.07	pencil	16.69		

WORD	SALIENCE RATING	WORD	SALIENCE RATING
turtle	16.29	**bucket**	15.73
leaf	16.28	plate	15.72
shark	16.26	corn	15.71
lobster	16.26	egg	15.68
road	16.26	crucifix	15.65
cannon	16.25	brick	15.64
casket	16.24	rattlesnake	15.64
breast	16.24	toad	15.64
kettle	16.24	bone	15.63
drum	16.22	**pen**	15.62
lumber	16.21	crocodile	15.61
marshmallows	16.19	arm	15.58
rifle	16.18	fly	15.57
scissors	16.18	fan	15.54
smile	16.17	hog	15.50
carrot	16.14	bear	15.49
goat	16.13	dandelion	15.49
lizard	16.13	rowboat	15.45
street	16.13	**skull**	15.44
toilet	16.09	barrel	15.42
hair	16.08	candle	15.42
doughnut	16.06	shoulder	15.42
screwdriver	16.05	python	15.41
clover	16.04	paint	15.38
timepiece	16.03	refrigerator	15.34
flood	16.00	doll	15.28
tent	15.99	shovel	15.27
cloud	15.93	**nail**	15.26
chain	15.92	canopener	15.24
monkey	15.92	hatchet	15.21
owl	15.91	cup	15.20
moon	15.91	moth	15.15
nickel	15.90	toaster	15.14
caterpillar	15.89	letter	15.10
telescope	15.88	fishhook	15.08
dagger	15.87	binoculars	14.92
spider	15.87	crow	14.91
boot	15.84	tire	14.64
tractor	15.83		
priest	15.79		
chest	15.79		
propeller	15.77		
truck	15.76		
whistle	15.76		
table	15.75		

Random Picture-Memory Task Grid

RANDOM PICTURE-MEMORY TASK

(To be filled out by student)

STUDENT SECRET 6-DIGIT CODE NUMBER

___ ___ ___ ___ ___ ___

(To be filled out by experimenter)

DATE

_____

START TIME OF SESSION

_____

SESSION CODE

_____

memory 1	image 1	explanation 1
memory 2	image 2	explanation 2
memory 3	image 3	explanation 3
memory 4	image 4	explanation 4
memory 5	image 5	explanation 5

memory 6	image 6	explanation 6
memory 7	image 7	explanation 7
memory 8	image 8	explanation 8
memory 9	image 9	explanation 9
memory 10	image 10	explanation 10

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Appendix XIII
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<u>Task Instructions</u>

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for the FREE IMAGE-ONLY GROUP ("Group 1")

RANDOM PICTURE-MEMORY TASK INSTRUCTIONS
</div>

This package contains:

      1. These instructions.
      2. A Random Picture-Memory Task booklet containing:
            a. An empty grid of 30 squares, called a "memory grid"
            b. A record sheet
            c. A blank page labelled "glue any unused images on page"
      3. An large envelope containing 20 printed images, each in a smaller envelope
      4. A stick of glue
      5. A short questionnaire called "Opinions about the Random Picture Task."

INSTRUCTIONS:

STEP 1. Write your 6-digit secret code number on the front cover of the "memory grid," and then open it and place it on the desk in front of you.

STEP 2. Relax for a moment, and then think of 10 memories from your life. Write a brief description of each memory in each of the boxes labelled "memory 1," "memory 2," .... all the way to "memory 10." You can use any memories that you like, going from your earliest childhood memories, to memories from yesterday. However, the task will work better is you have a good variety of memories from different periods of your life. Once you have written a memory in each of the 10 boxes, proceed to Step 3.

STEP 3. Take the large envelope with the 20 small envelopes in it, and stick your hand in and take out one of the 20 small envelopes. Open it, and take out the image inside. Then, on the "Random Picture-Memory Task Record Sheet," describe the image in a word or two in the space labelled "Drawn 1st." Put this image aside, and draw a second image from the large envelope. Open it, and describe it in the space labelled "Drawn 2nd." Repeat this process until you have drawn 10 images from the large envelope, and described them on the Record Sheet. Then put the large envelope with the remaining 10 small envelopes aside, and proceed to step 4.

STEP 4. Spread out the 10 images in front of you, look at them as a group, and then try to "fit" or "link" or "connect" each of the images to one of your memories. Take your time with this task, shuffle the images around on the grid, play with your ideas, etc, and try to "fit" or "connect" as many of the 10 images to your 10 memories as you can.

STEP 5. Once you have determined the best possible "fit" for the images, take the glue stick, and glue each image in the box beside the memory (these boxes are labelled "image 1," "image 2," etc), and write a brief explanation (in the boxes labelled "explanation 1," "explanation 2," etc.) of why each of the images "fits" or "connects" to the memory. After you have glued the images down, take any unused images and glue them to the blank page called "glue any unused images on this page."

STEP 6. Go to the "Random Picture-Memory Task Record Sheet" and complete the information on the right side of the page, indicating (a) whether or not you used the image, and (b) if used, the position it was glued to on the memory grid. Make sure to also fill in your secret 6-digit code number, date, and session time at the top of the page.

STEP 7. Close up the picture materials, place them aside, and then answer the questionnaire called "Opinions about the Random Picture Task."

STEP 8. Gather up all the materials, and turn everything in to the researcher. You are now free to leave the experiment.

for the CONSTRAINED IMAGE-ONLY TASK GROUP ("Group 2")

RANDOM PICTURE-MEMORY TASK INSTRUCTIONS

This package contains:

> 1. These instructions.
> 2. A Random Picture-Memory Task booklet containing:
>> a. An empty grid of 30 squares, called a "memory grid"
>> b. A record sheet
>> c. A blank page labelled "glue any unused images on page"
> 3. An large envelope containing 20 printed images, each in a smaller envelope.
> 4. A stick of glue
> 5. A short questionnaire called "Opinions about the Random Picture Task"

INSTRUCTIONS:

STEP 1. Write your 6-digit secret code number on the front cover of the "memory grid," and then open it and place it on the desk in front of you.

STEP 2. Relax for a moment, and then think of 10 memories from your life. Write a brief description of each memory in each of the boxes labelled "memory 1," "memory 2," .... all the way to "memory 10." You can use any memories that you like, going from your earliest childhood memories, to memories from yesterday. However, the task will work better is you have a good variety of memories from different periods of your life. Once you have written a memory in each of the 10 boxes, proceed to Step 3.

STEP 3. Take the large envelope with the 20 small envelopes in it, and stick your hand in and take out one of the 20 small envelopes. Open it, and take out the image inside. Then, on the "Random Picture-Memory Task Record Sheet," describe the image in a word or two in the space labelled "Drawn 1st."

STEP 4. Compare the image to your first memory which you have written in the "memory 1" box, and try to "fit" or "link" or "connect" the image to your first memory. Take your time with this task, and play with your ideas.

STEP 5. Once you have determined a "fit" or "connection" between the first image and your first memory, take the glue stick, and glue the image into the space labelled "image 1," then write a brief explanation of why the image connects to your memory in the box labelled "explanation 1." *If you cannot think of any way that the first image "connects" to your first memory, then instead glue the image to the page labelled "glue any unused images on this page."* Finally, go to the "Random Picture-Memory Task Record Sheet" and indicate whether or not you used the image. Make sure to also fill in your secret 6-digit code number, date, and session time at the top of the page.

STEP 6. Draw a second image from the envelope, and repeat the process for your second memory. Then repeat the process for a 3rd image, a 4th image, etc.....until you done this for all 10 memories. You should now have a total of 10 images glued to either the "memory grid" or to the "unused images" page.

STEP 7. Close up the picture materials, place them aside, and then answer the questionnaire called "Opinions about the Random Picture Task"

STEP 8. Gather up all the materials, and turn everything in to the researcher. You are now free to leave the experiment.

Posttask Questionnaire used by Group 1 and Group 2

Opinions About the Random-Picture Task

1. When you were doing the picture selections after writing down your memories, did any of the pictures you randomly selected "trigger" a sudden flood of memories?

    [ ] NO   [ ] YES

    If "YES," which picture was the trigger?_____

2. Did any of the pictures you randomly selected "match up" almost perfectly with any of the memories you had written down on the grid?

    [ ] NO   [ ] YES

    If "YES," which picture was it?_____

    If more than one, please list_____

    _____

3. On a scale of 1 to 7, to what extent did the pictures you randomly selected seem to "fit together" in such a way that you could have arranged them in the form of a story?

    NOT AT   VERY

    ALL   MUCH

    1   2   3   4   5   6   7

4. In general, considered as a whole, how often do you think about the memories you wrote down on the grid (not counting today)?

    NEVER   FREQUENTLY

    1   2   3   4   5   6   7

5. On a scale of 1 to 7, how often do you thing about the role of chance and coincidence in your life generally (not counting today)?

    NEVER   FREQUENTLY

    1   2   3   4   5   6   7

6. On a scale of 1 to 7, to what extent do you think that writing your memories down and doing the picture matching task has led you think differently about the memories than you may have in the past?

    NO EFFECT   BIG EFFECT
    ON HOW I   ON HOW I
    THINK ABOUT THEM   THINK ABOUT THEM

    1   2   3   4   5   6   7

THANK YOU VERY MUCH FOR COMPLETING THIS PART OF THE RESEARCH. PLEASE
HAND IN THE MATERIALS TO THE RESEARCHER.

for the FREE AUTOBIOGRAPHY-ONLY GROUP ("Group 3")
and FREE IMAGE PLUS FREE AUTOBIOGRAPHY GROUP ("Group 5")

"Chance Events & Coincidences in My Life Story"

6-Digit Secret Code Number_____Date_____

Time of session_____

INSTRUCTIONS: In this part of the study, you are asked to reflect back on your experience of life and living so far, and to write about the role of chance event(s) and/or unusual coincidence(s) in your life. *Select the strangest, most unusual chance event that you can think of — one that stands out from all the rest, one that may have seemed or felt to you at the time that it might have been be due to "something more" than just chance or something more than just a simple coincidence.* You are completely free to approach this task in any way that you like, and you can write about your experience in any way that you want. The only "rule" is that you provide (a) sufficient detail in the story for the researcher to understand how the "parts" of each chance event or coincidence fit together, and (b) if applicable, your reasons for thinking or feeling that the event may not have been due to just chance alone . Use the space below for your story. If you run out of room, use the reverse side of the page to continue. After you have written your description, please fill out the short questionnaire on the next page.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(USE REVERSE SIDE IF NEEDED)

When finished writing about your experience, please complete the questionnaire that starts on the next page

Questionnaire Concerning your Experience

1. In your account, how many SEPARATE "parts," "elements," or "events" can you identify as having been necessary for the whole chance event or coincidence to have occurred the way it did? Write the number in the space below:

Number of separate parts, elements, or events = _____

2. Which part, event, or element was the starting point or "trigger" for the event?

_____

3. Which of the following comes closest to describing a "category" for the type of event the trigger was? (PLEASE CHECK ONLY ONE)

[ ] 1. Being in an unfamiliar location by choice or deliberate plans (e.g., planned vacation)
[ ] 2. Being in an unfamiliar location not by choice (e.g., being lost, spontaneous change of plans, etc.)
[ ] 3. Having a chance meeting of someone new or unknown to you
[ ] 4. Having a chance meeting of someone known to you, but not known that well, or not seen in a long time
[ ] 5. Having an unfortunate unplanned event happen (e.g., serious accident or illness, death in family)
[ ] 6. Having a change in your daily routine (e.g., starting a new job, going to university, moving)
[ ] 7. Noticing a recurring trivial event.
[ ] 8. Having an event occur related to communication (e.g., a phone call, a letter, something on the radio)
[ ] 9. Having a hunch, intuition, dream, or daydream
[ ] 10. OTHER: please describe _____

4. Which of the following categories comes closest to describing the overall "theme" or content" of your experience?

[ ] 1. Meeting a romantic partner
[ ] 2. Forming an important but not romantic friendship or relationship
[ ] 3. Getting a job, getting a promotion, etc.
[ ] 4. Winning or finding money, winning a lottery, etc.
[ ] 5. Being saved from harm, danger, or even death
[ ] 6. Finding something lost or sought (e.g., a lost pet, a lost piece of jewellery, a hard to find book, etc.)
[ ] 7. Having some kind of problem being solved, obstacle being overcome, etc.
[ ] 8. Perceiving some kind of mystery; seeing something behind the world of surface appearances, new view of reality
[ ] 9. Having an insight into values, goals & direction, morality, purpose of one's life, etc.
[ ] 10. OTHER: please describe_____

5.   On a scale of 1 to 7, how "strange," "weird " or "surreal" did the event feel?

        NOT AT ALL   VERY MUCH

            1   2   3   4   5   6   7

6.   On a scale of 1 to 7, how much impact did the event have in your life?

        NO IMPACT   A LOT OF IMPACT

            1   2   3   4   5   6   7

7.   To the extent that the event had an impact on your life, which of the following comes closest to categorizing the kind of impact it had?

        [ ] 1. Romance related impact
        [ ] 2. Friendship related impact
        [ ] 3. Job or career related impact
        [ ] 4. Money related impact
        [ ] 5. Health related impact
        [ ] 6. Education-related impact
        [ ] 7. Goal or Decision related impact
        [ ] 8. Spiritual or religious impact
        [ ] 9. Other: _____

8.   On a scale of 1 to 7, how "negative," neutral," or "positive" was the event?

        NEGATIVE   NEUTRAL   POSITIVE

           1   2   3   4   5   6   7

9.   On a scale of 1 to 7, how often do you think about the event you described (not counting today)?

        NEVER   FREQUENTLY

           1   2   3   4   5   6   7

10.   One a scale of 1 to 7, how often do you think about the role of chance and coincidence in your life generally (not counting today)?

        NEVER   FREQUENTLY

           1   2   3   4   5   6   7

11. On a scale of 1 to 7, to what extent do you think that writing about the event you described today has led you to think differently about it than you may have in the past?

| NO EFFECT ON HOW I THINK ABOUT IT | | | | | BIG EFFECT ON HOW I THINK ABOUT IT | |

    1   2   3   4   5   6   7

12. If you have any additional comments you would like to make, please write them in the space below:

_____

_____

_____

THANK YOU VERY MUCH FOR COMPLETING THIS PART OF THE RESEARCH.

PLEASE HAND IN THE MATERIALS TO THE RESEARCHER.

for the CONSTRAINED AUTOBIOGRAPHY-ONLY GROUP ("Group 4")
and CONSTRAINED IMAGE PLUS CONSTRAINED AUTOBIOGRAPHY GROUP
("Group 6")

Coincidence Experience Form

6-Digit Secret Code Number_____

Date_____ Time of session_____

INSTRUCTIONS: In this part of the study, you are asked to reflect back on your experience of life and living so far, and to think about the role of chance event(s) and/or unusual coincidences(s) in your life. *Select the strangest, most unusual chance event that you can think of – one that stands out from all the rest, one that may have seemed or felt to you at the time that it might have been due to "something more" than just chance or something more than just a simple coincidence.* However, unlike a traditional prose form of story construction, this task is best approached by organizationally "blocking" the events using a standardized response format, and following several rules, as described below:

Procedural Rules

Rule 1. **DO NOT WRITE OUTSIDE THE BOXES,** because this form will be scanned by a computer that is set up to only read material written inside the boxes.

Rule 2. **USE ONLY THE PENS PROVIDED,** because system tests showed that the ink used in these pens (from the ones tested) produced the best quality scan with the scanner.

Content Rules

Rule 3. **CHOOSE YOUR COINCIDENCE CAREFULLY,** because by strictest definition, a coincidence is the occurrence of two *causally unrelated events*. What this means is that the events involved in your coincidence **cannot** in any possible logical or rational way be related to each other in a cause/effect relationship. For example, finding a 10$ bill on the street when you have no money is not, in the strictest sense, a coincidence, because needing the money may have unconsciously caused you to be more attentive in environments in which you might logically expect to find money, and in this way, your need for money indirectly helped (i.e., "caused") you to find the money.

Rule 4. **CHOOSE YOUR COINCIDENCE CAREFULLY,** because, again, by definition, a coincidence involves two events that happen close together in time, for example, not more than a day or two apart. The exception to this rule is if the coincidence involves *similar events which occur repeatedly over a long period of time.* Make sure that your coincidence has events occurring not more than a couple of days apart unless it is one that has *similar events occurring repeatedly over a long period of time.*

Interpretation Rule

Rule 5. **PROVIDE TWO INTERPRETATIONS:** Most scientists do not believe in coincidences and brush them off as "unscientific," saying that they are a form of "self-delusion," "illusory correlation," or "superstitious primitive thinking." The researcher is undecided on the issue to the extent that he believes that there are two kinds of truth – "scientific truth" and "human truth" and that neither type of truth is any "better" than the other. Interestingly, previous research has shown that about 90% of people have experienced at least one coincidence, and will typically interpret it in both ways! Therefore, in the interpretation section, you are asked to provide two interpretations for your coincidence: one based on your feelings and emotions, and the other a more "scientific" explanation based on reason and logic.

TURN NOW TO THE NEXT PAGE AND FILL IN THE FORM

A coincidence involves two causally unrelated events. In the boxes below, provide a brief description of each of the major events in your coincidence.

Event #1   Event #2

In the box below, provide a brief description of the time, place, or situation leading up to or surrounding the events that were involved in your coincidence

In the box below, provide a brief description of how you felt or what you thought right after the coincidence.

| |
|--|
| |

In the box below, provide a brief description of how the coincidence affected your life in the long run

In the box below, provide your "feeling-based" interpretation of why the coincidence happened.
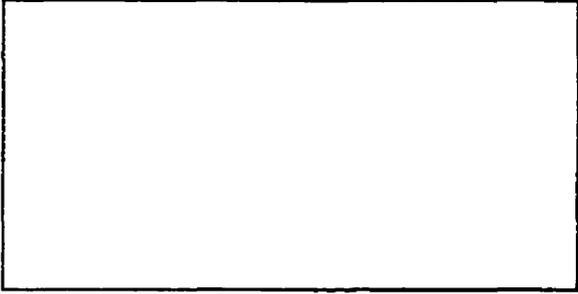
In the box below, provide your "scientific" interpretation of why the coincidence happened.
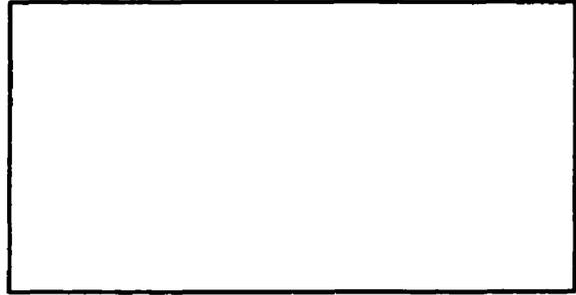
WHEN YOU HAVE FINISHED THIS, TURN TO THE NEXT PAGE AND FILL OUT THE QUESTIONNAIRE

Questionnaire Concerning your Experience

1. Although there was only room for 2 major events in the previous section, your experience may have had more than 2 events. How many SEPARATE "parts," "elements," or "events" can you identify as having been necessary for the whole chance event or coincidence to have occurred the way it did? Write the total number in the space below:

   Number of separate parts, elements, or events = _____

2. Identify a part, event, or element was the starting point or "trigger" for the event?

   _____

3. Which of the following comes closest to describing a "category" for the type of event the trigger was? (PLEASE CHECK ONLY ONE)

   [ ] 1. Being in an unfamiliar location by choice or deliberate plans (e.g., planned vacation)
   [ ] 2. Being in an unfamiliar location not by choice (e.g., being lost, spontaneous change of plans, etc.)
   [ ] 3. Having a chance meeting of someone new or unknown to you
   [ ] 4. Having a chance meeting of someone known to you, but not known that well, or not seen in a long time
   [ ] 5. Having an unfortunate unplanned event happen (e.g., serious accident or illness, death in family)
   [ ] 6. Having a change in your daily routine (e.g., starting a new job, going to university, moving).
   [ ] 7. Noticing a recurring trivial event.
   [ ] 8. Having an event occur related to communication (e.g., a phone call, a letter, something on the radio)
   [ ] 9. Having a hunch, intuition, dream, or daydream
   [ ] 10. OTHER: please describe_____

4. Which of the following categories comes closest to describing the overall "theme" or "content" of your experience?

   [ ] 1. Meeting a romantic partner
   [ ] 2. Forming an important but not romantic friendship or relationship
   [ ] 3. Getting a job, getting a promotion, etc.
   [ ] 4. Winning or finding money, winning a lottery, etc.
   [ ] 5. Being saved from harm, danger, or even death
   [ ] 6. Finding something lost or sought (e.g., a lost pet, a lost piece of jewellery, a hard to find book, etc.)
   [ ] 7. Having some kind of problem being solved, obstacle being overcome, etc.
   [ ] 8. Perceiving some kind of mystery; seeing something behind the world of surface appearances, new view of reality
   [ ] 9. Having an insight into values, goals & direction, morality, purpose of one's life, etc.
   [ ] 10. OTHER: please describe_____

5.   On a scale of 1 to 7, how "strange," "weird " or "surreal" did the event feel?

        NOT AT ALL   VERY MUCH

             1   2   3   4   5   6   7

6.   On a scale of 1 to 7, how much impact did the event have in your life?

        NO IMPACT   A LOT OF IMPACT

             1   2   3   4   5   6   7

7.   To the extent that the event had an impact on your life, which of the following comes
     closest to categorizing the kind of impact it had?

                    [ ] 1. Romance related impact
                    [ ] 2. Friendship related impact
                    [ ] 3. Job or career related impact
                    [ ] 4. Money related impact
                    [ ] 5. Health related impact
                    [ ] 6. Education-related impact
                    [ ] 7. Goal or Decision related impact
                    [ ] 8. Spiritual or religious impact
                    [ ] 9. Other: _____

8.   One a scale of 1 to 7, how "negative," neutral," or "positive" was the event?

        NEGATIVE   NEUTRAL   POSITIVE

             1   2   3   4   5   6   7

9.   On a scale of 1 to 7, how often do you think about the event you outlined (not counting
     today)?

        NEVER   FREQUENTLY

             1   2   3   4   5   6   7

10. One a scale of 1 to 7, how often do you think about the role of chance and coincidence in
     your life generally (not counting today)?

        NEVER   FREQUENTLY

             1   2   3   4   5   6   7

11.   On a scale of 1 to 7, to what extent do you think that writing about the event you
        described today has led you to think differently about it than you may have in the past?

NO EFFECT					BIG EFFECT	
ON HOW I					ON HOW I	
THINK ABOUT IT					THINK ABOUT IT	

                1   2   3   4   5   6   7

11.   If you have any additional comments you would like to make, please write them in the
        space below:

_____

_____

_____

THANK YOU VERY MUCH FOR COMPLETING THIS PART OF THE RESEARCH.

PLEASE HAND IN THE MATERIALS TO THE RESEARCHER.

for FREE IMAGE-TASK-PLUS-AUTOBIOGRAPHY GROUP ("Group 5")

RANDOM PICTURE-MEMORY TASK INSTRUCTIONS

This package contains:

1. These instructions.
2. A Random Picture-Memory Task booklet containing:
   a. An empty grid of 30 squares, called a "memory grid"
   b. A record sheet
   c. A blank page labelled "glue any unused images on page"
3. An large envelope containing 20 different printed images, each in a smaller envelope
4. A stick of glue
5. A form called "Chance Events & Coincidences in My Life"

INSTRUCTIONS:

STEP 1. Write your 6-digit secret code number on the front cover of the "memory grid," and then open it and place it on the desk in front of you.

STEP 2. Relax for a moment, and then think of 10 memories from your life. Write a brief description of each memory in each of the boxes labelled "memory 1," "memory 2," .... all the way to "memory 10." You can use any memories that you like, going from your earliest childhood memories, to memories from yesterday. However, the task will work better is you have a good variety of memories from different periods of your life. Once you have written a memory in each of the 10 boxes, proceed to Step 3.

STEP 3. Take the large envelope with the 20 small envelopes in it, and stick your hand in and take out one of the 20 small envelopes. Open it, and take out the image inside. Then, on the "Random Picture-Memory Task Record Sheet," describe the image in a word or two in the space labelled "Drawn 1st." Put this image aside, and draw a second image from the large envelope. Open it, and describe it in the space labelled "Drawn 2nd." Repeat this process until you have drawn 10 images from the large envelope, and described them on the Record Sheet. Then put the large envelope with the remaining 10 small envelopes aside, and proceed to step 4.

STEP 4. Spread out the 10 images in front of you, look at them as a group, and then try to "fit" or "link" or "connect" each of the images to one of your memories. Take your time with this task, shuffle the images around on the grid, play with your ideas, etc, and try to "fit" or "connect" as many of the 10 images to your 10 memories as you can.

STEP 5. Once you have determined the best possible "fit" for the images, take the glue stick, and glue each image in the box beside the memory (these boxes are labelled "image 1," "image 2," etc), and write a brief explanation (in the boxes labelled "explanation 1," "explanation 2," etc.) of why each of the images "fits" or "connects" to the memory. After you have glued the images down, take any unused images and glue them to the blank page called "glue any unused images on this page."

STEP 6. Go to the "Random Picture-Memory Task Record Sheet" and complete the information on the right side of the page, indicating (a) whether or not you used the image, and (b) if used, the position it was glued to on the memory grid. Make sure to also fill in your 6-digit secret code number, date, and session time at the top of the page.

STEP 7. Gather up all the materials, set them aside, and then complete the form entitled "Chance Events & Coincidences in My Life." When finished, turn everything in to the researcher. You are now free to leave the experiment.

for CONSTRAINED IMAGE-TASK-PLUS-AUTOBIOGRAPHY GROUP ("Group 6")

RANDOM PICTURE-MEMORY TASK INSTRUCTIONS

This package contains:

1. These instructions.
2. A Random Picture-Memory Task booklet containing:
   a. An empty grid of 30 squares, called a "memory grid"
   b. A record sheet
   c. A blank page labelled "glue any unused images on page"
3. An large envelope containing 20 different printed images, each in a smaller envelope
4. A stick of glue
5. A form called "Coincidence Experience Form"

INSTRUCTIONS:

STEP 1. Write your 6-digit secret code number on the front cover of the "memory grid" and then open it and place it on the desk in front of you

STEP 2. Relax for a moment, and then think of 10 memories from your life. Write a brief description of each memory in each of the boxes labelled "memory 1," "memory 2," .... all the way to "memory 10." You can use any memories that you like, going from your earliest childhood memories, to memories from yesterday. However, the task will work better is you have a good variety of memories from different periods of your life. Once you have written a memory in each of the 10 boxes, proceed to Step 3.

STEP 3. Take the large envelope with the 20 small envelopes in it, and stick your hand in and take out one of the 20 small envelopes. Open it, and take out the image inside. Then, on the "Random Picture-Memory Task Record Sheet," describe the image in a word or two in the space labelled "Drawn 1st."

STEP 4. Compare the image to your first memory which you have written in the "memory 1" box, and try to "fit" or "link" or "connect" the image to your first memory. Take your time with this task, and play with your ideas.

STEP 5. Once you have determined a "fit" or "connection" between the first image and your first memory, take the glue stick, and glue the image into the space labelled "image 1," then write a brief explanation of why the image connects to your memory in the box labelled "explanation 1." *If you cannot think of any way that the first image "connects" to your first memory, then instead glue the image to the page labelled "glue any unused images on this page."* Finally, go to the "Random Picture-Memory Task Record Sheet" and indicate whether or not you used the image. Make sure to fill in your 6-digit secret code number, date, and session time at the top of the page.

STEP 6. Draw a second image from the envelope, and repeat the process for your second memory. Then repeat the process for a 2nd image, a 3rd image, etc.....until you done this for all 10 memories. You should now have a total of 10 images glued to either the "memory grid" or to the "unused images" page.

STEP 7. Gather up all the materials, set them aside, and then complete the "Coincidence Experience Form.". When finished, turn everything in to the researcher. You are now free to leave the experiment.

Appendix XIV

Blank sheet for unused images

PLEASE GLUE ANY UNUSED IMAGES ONTO THIS BLANK SHEET.

Appendix XV

Random Picture-Memory Task Record Sheet for FREE IMAGE TASK GROUPS

Random Picture-Memory Task Record Sheet

Please fill in the following information, which is to give the researcher a record of the order of the images that you withdrew from the envelope and a record just in case any of the images come unglued and fall off the page after the experiment is finished.

Name_____ Code Number_____

Date_____ Time of Session_____

In the column of spaces below, give a one or two word description of each image *in the order* that you drew them from the envelope:

In the column below, use an "X" to indicate if you used the image or not, and if used, write in a number to indicate in which position it used on the "memory-image grid"

	USED	POSITION	NOT USED
Drawn 1st_____	_____	_____	_____
Drawn 2nd_____	_____	_____	_____
Drawn 3rd_____	_____	_____	_____
Drawn 4th_____	_____	_____	_____
Drawn 5th_____	_____	_____	_____
Drawn 6th_____	_____	_____	_____
Drawn 7th_____	_____	_____	_____
Drawn 8th_____	_____	_____	_____
Drawn 9th_____	_____	_____	_____
Drawn 10th_____	_____	_____	_____

Random Picture Memory Task Record Sheet for CONSTRAINED IMAGE TASK
GROUPS

Random Picture-Memory Task Record Sheet

Please fill in the following information, which is to give the researcher a record of the
order of the images that you withdrew from the envelope and a record just in case any of
the images come unglued and fall off the page after the experiment is finished.

Name_____Code Number_____

Date_____Time of Session_____

In the column of spaces below, give a one or two word description of each image *in the order* that you drew them from the envelope:

In the column below, use an "X" to indicate if you used the image or not

	USED	NOT USED
Drawn 1st_____	_____	_____
Drawn 2nd_____ _____	_____	_____
Drawn 3rd_____	_____	_____
Drawn 4th_____	_____	_____
Drawn 5th_____	_____	_____
Drawn 6th_____	_____	_____
Drawn 7th_____	_____	_____
Drawn 8th_____	_____	_____
Drawn 9th_____	_____	_____
Drawn 10th_____	_____	_____

Appendix XVI

REFLECTIONS ON CHANGES IN YOUR LIFE SO FAR THIS YEAR

DIRECTIONS: In this last section of the questionnaire, you are asked to think about your life in the last several months and whether or not there have been any change in your feelings, attitudes, views, goals, etc.

Below is a list of different experiences of life & living. They are expressed in a way that can be answered by indicating if there has been a change resulting in "less of" of the experience (which can be indicated by a negative number), "no change" in the amount or quality of the experience (which can be indicated by a zero), or a change resulting in "more of" the experience (which can be indicated by a positive number):

For example, if you were asked how much change there had been in the amount of TV you watched in the last few months, you could answer anywhere along the following scale that goes from -3 to +3:

Much Less		No Change		Much More		
-3	-2	-1	0	+1	+2	+3

HOWEVER, BECAUSE THE BUBBLE-SHEET DOES NOT HAVE NEGATIVE NUMBERS, YOU WILL BE REQUIRED TO MENTALLY "TRANSLATE" THE SCALE TO A SCALE THAT GOES FROM 1 TO 7, AS BELOW:

Much Less		No Change		Much More		
1	2	3	4	5	6	7

Therefore, using a 1 to 7 scale, answer the following questions, which start on the next page:

next page....

Starting with bubble sheet bubble #57, to what extent have the following aspects and experiences of life changed for you in the last several months?

	Much Less			No Change			Much More
57. clarity about your goals in life?	1	2	3	4	5	6	7
58. happiness with life-in-general?	1	2	3	4	5	6	7
59. how motivated you feel in general?	1	2	3	4	5	6	7
60. feelings that your life is "in control"?	1	2	3	4	5	6	7
61. optimism about the future?	1	2	3	4	5	6	7
62. amount of stress in your life?	1	2	3	4	5	6	7
63. feeling that your life "makes sense" to you?	1	2	3	4	5	6	7
64. sense of potentials and possibilities in your life?	1	2	3	4	5	6	7
65. sense of "being connected" to others in your life?	1	2	3	4	5	6	7
66. sense of "being connected" to life-in-general?	1	2	3	4	5	6	7
67. sense that life has meaning and purpose?	1	2	3	4	5	6	7
68. how tense you generally feel?	1	2	3	4	5	6	7
69. how tolerant you feel about others?	1	2	3	4	5	6	7
70. how tolerant you feel about life's unpredictability?	1	2	3	4	5	6	7
71. how tolerant you feel about life's uncertainties?	1	2	3	4	5	6	7
72. level of trust that things will "work out in the end"?	1	2	3	4	5	6	7
73. presence of feelings of adventure in your life?	1	2	3	4	5	6	7
74. presence of feelings of boredom in your life?	1	2	3	4	5	6	7
75. presence of feelings of mystery in you life?	1	2	3	4	5	6	7
76. feelings of overall "energy" for life?	1	2	3	4	5	6	7

THANK YOU FOR PARTICIPATING IN THIS RESEARCH. PLEASE HAND IN ALL MATERIALS TO THE RESEARCHER.

Appendix XVII

Consent forms for three experimental groups

<u>for Post-Task Only Group:</u>

Informed Consent Form

Before starting your participation in this research, please read, date, and sign this form to indicate that you are generally aware of what you will be required to do in the study.

This study has been approved by the Department of Psychology Human Ethical Review Committee (HERC Approval number 99-153).

The study involves filling out a questionnaire that asks numerous questions about your life in general (e.g., attitudes, experiences, preferences for different aspects of life, etc.). The time allowed to do the questionnaire is 1.5 hours, and thus, is worth 3 experimental credits, however, if you complete the questionnaire in less time, you will still get the full 3 credits.

Finally, you can rest assured that all data collected by the researcher will be kept anonymously (using a secret 6-digit secret code number selected by you and known only to you). No one other than the researcher will have access to the data, and any subsequent reporting of the results of the study will be in aggregate form only (i.e., overall group averages, etc.), and the researcher will not be able to identify any individual by name.

I, (print name) _____, have read and understand the above information concerning my participation in this research, and agree to participate in the study.

Signature_____

Student number_____

Your Psychology Instructor's Name_____

Date_____

PLEASE TURN TO NEXT PAGE FOR SECRET CODE NUMBER INSTRUCTIONS

Selecting your 6-digit secret code number

Because this research involves filling in bubbles on more than one "bubble sheet" the researcher needs a way of matching the different bubble sheets.

In many studies, the matching is done on the basis of student number.

However, because of the personal nature of some parts of this research, instead of using your student number, you are asked to create and use a secret 6-digit code number, known only to you, to protect your anonymity (just like you use a personal password on the Internet or a bankcard password at a bank machine).

The use of a secret code number in this research will allow the researcher to match the sheets, and at the same time protect your identity.

Thus, **before doing anything else - you are asked to think of a 6-digit number that you will use for your secret code number for this research.**

The code number can be any 6-digit number you want, and one that you can remember.

This may be best achieved by selecting a number that has a personal meaning for you.

For example, you could use the year, month, and day of your mother's birthday expressed in numbers (e.g., 1949, April 10 = 490410), the last six-digits of your best friend's phone number, or any other 6-digit number that you can be sure you can remember because it has unique personal meaning for you and no one else.

Select this number now.

To help you remember, write the number down somewhere where it is always accessible (e.g., in your pocket calendar that you always carry with you, on a slip of paper in your wallet, etc.).

In case you don't have any paper on you.....

Write your number in the spaces below:

____ ____ ____ ____ ____

DETACH THIS PAGE from the CONSENT FORM, FOLD THIS PAGE UP, and PUT IT IN YOUR POCKET OR OTHER SAFE PLACE.

ONCE YOU HAVE DONE THIS, YOU MAY CONTINUE DOING THE REST OF THIS QUESTIONNAIRE.

<u>for Pre-Task Post-Task Only Group:</u>

Informed Consent Form

Before starting your participation in this research, please read, date, and sign this form to indicate that you are generally aware of what you will be required to do in the study.

This study has been approved by the Department of Psychology Human Ethical Review Committee (HERC Approval number 99-153).

The study involves your participation at two different times (or "sessions") over about a 6 week period. The first session (today) involves filling out a questionnaire that asks numerous questions about your life in general (e.g., attitudes, experiences, preferences for different aspects of life, etc.). The time allowed to do the questionnaire is 1.5 hours, and thus, the first session is worth 3 experimental credits.

The second session (to be separately scheduled) will require you to complete a "follow-up" questionnaire, and will be 1 hour long and thus, worth 2 credits.

Because each session is part of a *single* study, you are required to participate in both sessions. Your participation will be worth 5 'credits' towards your course grade (if you are enrolled in a psychology course for which you get experimental credits). After beginning the study, you may withdraw your participation without any academic *penalty* (however, you will not receive full credits). To officially withdraw without academic penalty, and to receive partial credit for the first session attended, you must state your withdrawal in a written note to the researcher *before* the second scheduled session.

Finally, you can rest assured that all data collected by the researcher will be kept anonymously (using a secret 6-digit secret code number selected by you and known only to you). No one other than the researcher will have access to the data, and any subsequent reporting of the results of the study will be in aggregate form only (i.e., overall group averages, etc.), and the researcher will not be able to identify any individual by name.

I, (print name) _____, have read and understand the above information concerning my participation in this research, and agree to participate in the study.

Signature_____

Student number_____

Your Psychology Instructor's Name_____

Date_____

PLEASE TURN TO NEXT PAGE FOR SECRET CODE NUMBER INSTRUCTIONS

Selecting your 6-digit secret code number

Because this research involves your participation in more than one session, the researcher needs a way of matching your data across both of the sessions. In many studies, the matching is done on the basis of student number.

However, because of the personal nature of some parts of this research, instead of using your student number, you are asked to create and use a secret 6-digit code number, known only to you, to protect your anonymity (just like you use a personal password on the Internet or a bankcard password at a bank machine).

The use of a secret code number in this research will allow the researcher to match your data across sessions, and at the same time protect your identity.

Thus, **before doing anything else - you are asked to think of a 6-digit number that you will use for your secret code number for this research.**

The code number can be any 6-digit number you want, but above all, **it should be a number you are sure you can remember** for both sessions.

This may be best achieved by selecting a number that has a personal meaning for you.

For example, you could use the year, month, and day of your mother's birthday expressed in numbers (e.g., 1949, April 10 = 490410), the last six-digits of your best friend's phone number, or any other 6-digit number that you can be sure you can remember because it has unique personal meaning for you and no one else.

Select this number now.

To help you remember, write the number down somewhere where it is always accessible (e.g., in your pocket calendar that you always carry with you, on a slip of paper in your wallet, etc.).

In case you don't have any paper on you.....

Write your number in the spaces below:

——— ——— ——— ——— ——— ———

DETACH THIS PAGE from the CONSENT FORM, FOLD THIS PAGE UP, and PUT IT IN YOUR POCKET OR OTHER SAFE PLACE.

ONCE YOU HAVE DONE THIS, YOU MAY CONTINUE DOING THE REST OF THIS QUESTIONNAIRE.

<u>for 6 Experimental Condition Groups:</u>

Informed Consent Form

Before starting your participation in this research, please read, date, and sign this form to indicate that you are generally aware of what you will be required to do in the study.

This study has been approved by the Department of Psychology Human Ethical Review Committee (HERC Approval number 99_153).

The study involves your participation at three different times (or "sessions") over about a 6 week period. The first session (today) involves filling out a questionnaire that asks numerous questions about your life in general (e.g., attitudes, experiences, preferences for different aspects of life, etc.). The time allowed to do the questionnaire is 1.5 hours, and thus, the first session is worth 3 experimental credits.

The second session (to be separately scheduled) will require you to do one of several harmless and hopefully enjoyable and interesting tasks and then to answer a brief survey-style questionnaire about the task(s) that you did. The tasks will be randomly determined just before the second session, and may involve doing things like selecting and arranging photographs and/or writing brief descriptions about certain experiences that you may or may not have had in your life, etc. The time allowed for the second session will also be 1.5 hours, and as such, will also be worth 3 experimental credits.

The third session (to be separately scheduled) will require you to complete a "follow-up" questionnaire, and will be 1 hour long and thus, worth 2 credits.

Because each of the three sessions are part of a *single* study, you are required to participate in all three sessions. Your participation will be worth 8 'credits' towards your course grade (if you are enrolled in a psychology course for which you get experimental credits). After beginning the study, you may withdraw your participation without any academic *penalty* (however, you will not receive full credits). To officially withdraw without academic penalty, and to receive partial credit for sessions attended, you must state your withdrawal in a written note to the researcher *before* your next scheduled session.

Finally, you can rest assured that all data collected by the researcher will be kept anonymously (using a secret 6-digit secret code number selected by you and known only to you). No one other than the researcher will have access to the data, and any subsequent reporting of the results of the study will be in aggregate form only (i.e., overall group averages, etc.), and the researcher will not be able to identify any individual by name.

I, (print name) _____ , have read and understand the above information concerning my participation in this research, and agree to participate in the study.

Signature_____

Student number_____

Your Psychology Instructor's Name_____

Date_____

PLEASE TURN TO NEXT PAGE FOR SECRET CODE NUMBER INSTRUCTIONS

Selecting your 6-digit secret code number

Because this research involves your participation in more than one session, the researcher needs a way of matching your data across all of the three sessions.

In many studies, the matching is done on the basis of student number.

However, because of the personal nature of some parts of this research, instead of using your student number, you are asked to create and use a secret 6-digit code number, known only to you, to protect your anonymity (just like you use a personal password on the Internet or a bankcard password at a bank machine).

The use of a secret code number in this research will allow the researcher to match your data from different sessions, and at the same time protect your identity.

Thus, **before doing anything else - you are asked to think of a 6-digit number that you will use for your secret code number for this research.**

The code number can be any 6-digit number you want, but above all, **it should be a number you are sure you can remember** for both the second and third sessions.

This may be best achieved by selecting a number that has a personal meaning for you.

For example, you could use the year, month, and day of your mother's birthday expressed in numbers (e.g., 1949, April 10 = 490410), the last six-digits of your best friend's phone number, or any other 6-digit number that you can be sure you can remember because it has unique personal meaning for you and no one else.

Select this number now.

To help you remember, write the number down somewhere where it is always accessible (e.g., in your pocket calendar that you always carry with you, on a slip of paper in your wallet, etc.).

In case you don't have any paper on you.....

Write your number in the spaces below:

____ ____ ____ ____ ____

DETACH THIS PAGE from the CONSENT FORM, FOLD THIS PAGE UP, and PUT IT IN YOUR POCKET OR OTHER SAFE PLACE. ONCE YOU HAVE DONE THIS, YOU MAY CONTINUE DOING THE REST OF THIS QUESTIONNAIRE.

<div align="center">Appendix XVIII</div>

Experiment debriefing

Dear Participant,

First, I would like to thank you very much for participating in my study. For a number of years, I have been fascinated by the way that chance events and coincidences seem to sometimes "make so much sense" in peoples' lives that they seem to have been "destined" to happen, as if by "fate." Sometimes, these coincidences are amusing but have no lasting effect, while at other times, they can be so profound that they are experienced almost like a "religious experience" that can change the way a person experiences and understands the deeper meaning of life. However, despite the potential importance of chance events in peoples' lives, psychology has all but ignored them as a research topic (one notable exception is the psychologist Carl Jung, who originated the now-familiar term "synchronicity" to denote the experience of strange and meaningful coincidences).

The task I set myself to in the research you have participated in was, I hope, a first step toward scientifically studying the experience of coincidence from a psychological perspective.

The first question I asked was "what particular quality characterizes the experience of a meaningful coincidence?" The answer that I gave to myself was that "when we experience a coincidence as meaningful, it is because it 'fits' into the story of our lives, that it becomes, in a manner of speaking, part of the 'plot,' rather than a just some chance event that 'hangs there' without being 'connected' to the rest of the 'story.' I call this "Narrative Emplotment" (a phrase I borrowed from the philosopher Paul Ricouer). The second question I asked, following from the first, was "why do some people experience meaningful coincidences more than other people?" In other words, "why do some people 'emplot' their experiences of chance while others do not?" This was the main question of the study.

Two personality variables that I thought of as being potentially related to 'emplotment' are The Desire for Control, and the Tolerance for Ambiguity. Although everyone likes to feel that their lives are "in control," some people need this feeling more than others in order to feel comfortable in their day-to-day lives, and from a personality perspective, these people are said to have high Desire for Control. The same can be said of ambiguity. Although we all like to know "what's going on" in order to have clarity in our lives, some people need this feeling of clarity more than others. From a personality perspective, we might describe these people as being low in their Tolerance of Ambiguity.

Now, consider chance events: we have *no control* over when they happen or what they are, and they are *ambiguous* in that we don't know exactly what they mean, what caused them, where they came from, etc.

It occurred to me then that people who have a high desire for control combined with a low tolerance of ambiguity would be the people most likely to experience meaningful coincidences or "synchronicity," -- that is, they would be the most likely to "emplot" their experiences of chance into the "story" of their on-going lives.

To test this theory, I assigned you and all the other participants in this study to one of several groups. Some filled out questionnaires (which included measures of tolerance of ambiguity and desire for control, among other things), while others filled out the questionnaires and also did an "emplotment task," which was either writing about their experiences of coincidence, or trying to 'fit' randomly selected images with a list of their own personal memories. Some people did both tasks. Further, some tasks were easy, and some were made intentionally more difficult or ambiguous in order to "draw out" the desire for control and intolerance of ambiguity in the people doing them.

Because the data is "just in," it will be at least several months before I do all the analyses that I need to do in order to make any conclusions about my "theory" of meaningful coincidence, and the study is way too complicated to explain in any further detail in this handout. However, once my study is completed (not for several months at least), I will be posting a simplified version of the results outside my office (P435B, Duff Roblin). In the meantime, if you are interested in getting more information, please feel free to contact me via the Department of Psychology, or you can E-mail me at hladkyj@cc.umanitoba.ca

Again, I thank you for your participation.