Abstract

Transcripts of live news broadcasts on 9/11 from the United States, Canada, and Qatar were obtained and analysed for structure and content. Scores on key cognitive and affective dependent variables were juxtaposed on the timeline of the terrorist attacks. Results show remarkably consistent patterns of integrative complexity and emotional positivity, particularly among North American newscasters, which together provide support for the notion of “disruptive stress.” Evidence was also found in support of terror management theory, in that death-related words were strongly positively related to anxiety and anger, this effect being moderated by psychological or ideological distance. Results are interpreted with reference to the cognitive manager model of integrative complexity, uncertainty and terror management. Limitations, implications and future directions are discussed.
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CHAPTER I
INTRODUCTION

A terror attack occurring at most places in the world precipitates shock, disbelief, uncertainty about an appropriate course of action, and possibly worry for the safety of those close to us. Psychologically, we are confronted with an out-of-the-ordinary situation, for which a relevant pre-existing script likely does not exist. In this broader sense, events such as terrorist attacks are terrifying simply because they constitute an unexpected and large-scale departure from the status quo. In the language of cognitive psychology, we are confronted with a barrage of schema-inconsistent information (Horowitz, 1986; Solomon, Iancu, & Tyano, 1997). For example, prior to September 11, 2001, very few people might have conceived of commercial airplanes as potential weapons. Consequently, in the immediate moments of a terror attack, our perpetually-limited cognitive resources are suddenly taxed with the effort required to comprehend the event. Factors such as physical injury, and knowing others in the affected area, further reduce the likelihood of our arriving at a logically sound course of action, as concerns become more specific and personally relevant (Leach, 2004). Uncertainty also plays a particularly powerful role, for, unlike with natural disasters, there is no identifiable “low point” after which the worst is over, and confusion reigns over both when it began or will

1 Exceptions to this rule may include places such as Israel, where a terrorist event is not a particularly singular event. However, it may be argued that the scale and targets of the terrorist attacks on September 11, 2001 may have required a revision of the “terrorism schema” even for Israelis.
end (Ofman, Mastria, & Steinberg, 1995). As time wears on and the situation sinks in, cognitive resources become available and reasoned action becomes more of a possibility. The paradox, however, is that it is often individuals' immediate reactions that can determine their survival or the quality thereof.

Even during ordinary experiences of danger or stress, our perceptions (including of objective criteria such as distance and time) are distorted (Werner & Wapner, 1955; Langer, Wapner, & Werner, 1961; 1965), attention becomes narrowed, thinking more rigid (Brewin, 2001a), reasoning less accurate (Leon & Revelle, 1985; Wickens, Stokes, Barnett, & Hyman, 1993), and the encoding of memories for peripheral events hampered (Brewin, 2001b). Physiological consequences associated with acute stress include increased blood pressure, galvanic skin response, secretion of neuroendocrines and cortisol (the latter of which has been implicated in learning and memory processes;

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2 Provoking a feeling of uncertainty is arguably one of the primary goals of terrorist acts, which attempt to strip away any prevailing psychological sense of security among the population-at-large through techniques of intimidation and fear (Frederick, 1987).

3 The effects of stress on memory overall has been described as curvilinear, with negative effects cumulating as the emotional intensity and duration of the stress increases (Brewin, 2001b).

4 These findings generalize to real-world and large-scale stressors. For example, a recent meta-analysis showed that "stressful event sequences" such as natural disasters are
Heim, Ehlert, & Hellhammer, 2000; Dougall & Baum, 2004), and are consistent with Cannon’s (1914) early and Selye’s (1956) later descriptions of the “fight-or-flight” response. Dispositional characteristics moderate the impact of stress on the individual (Somerfield & McCrae, 2000), through providing “resistance resources” (e.g., hardiness; Kobasa, Maddi, & Kahn, 1982; ), altering the perception of the events (e.g., explanatory style; Peterson, Seligman, & Vaillant, 1988) and of available social support (e.g., attachment style; e.g., Collins & Feeney, 2004), increasing reactivity to negative situations, as well as influencing the choice of coping methods (e.g., neuroticism; Bolger & Zuckerman, 1995).

During the impact phase of a disaster, with the release of high levels of stress hormones (endogenous opiates), some people experience periods of emotional numbness or detachment; but most run through a range of primary emotions\(^5\) including fear, anxiety, anger, helplessness, and horror (Brewin, 2001a). Much has also been made of the so-called “disaster syndrome,” characterized by a break in the continuity of consciousness, “freezing” in the face of danger, disorientation, and emotional detachment, that is said to afflict a significant minority of people (e.g., Baum, 1987; Leach, 2004). At the severe end of the spectrum, symptoms of acute stress disorder may associated with increases in both cortisol levels as well as natural and specific immunity responses (Segerstrom & Miller, 2004).

\(^5\) Secondary emotions are defined those which occur following the event (Brewin, 2001a).
appear, including visual hallucinations and dissociation (Siegel, 1984), in some cases contributing to a later diagnosis of post-traumatic stress disorder (PTSD).

Direct exposure to traumatic death in particular contributes to experiences of post-traumatic stress, especially when the degree of identification or kinship with the victims is high (Ursano, Fullerton, & Norwood, 2003). In support of this hypothesis, following the September 11, 2001 terrorist attacks in New York and Washington, the prevalence of probable cases of PTSD was reported to be significantly higher in those two cities than other major metropolitan areas or the rest of the country (Schlenger, Caddell, Ebert, Jordan, Rourke, Wilson, Thalji, Dennis, Fairbank, & Kulka, 2002). Even within New York City, those living closest to the site of the attacks were nearly 3 times as likely to show symptoms of PTSD than others living farther away (Galea, Ahern, Resnick, Kilpatrick, Bucuvalas, Gold, & Vlahov, 2002). In addition, other studies have found that watching images of people falling from the WTC towers predicted a higher prevalence of PTSD and depression, but only for those with a personal connection to the attacks (e.g., Ahern, Galea, Resnick, Kilpatrick, Bucuvalas, Gold, & Vlahov, 2002). Perceived similarity to the victims also mediated the relationship between media exposure and disaster-focused distress (Wayment, 2004).

On the morning of September 11, 2001, while thousands were directly affected by the attacks in New York, Washington, and Pennsylvania, millions of others across the world watched, transfixed by the horror unfolding live on television. Doubtless, the manner in which the breaking news was presented held the potential to influence the
viewing public’s psychological response. Unfortunately, repeated showings of traumatic stimuli such as the impact of the second plane into the WTC, and several false alarms (including widespread reports of a car bomb having exploded outside the State Department building in Washington, D.C.), may have inadvertently increased people’s perceptions of risk, and exacerbated the psychological impact of the attacks (Dougall, Hayward, & Baum, 2005). As a result, at least for a subset of these “vicarious victims,” even witnessing the terrorists attacks on television carried negative psychological consequences comparable to those who experienced the attacks directly (Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002; Schuster, Stein, Jaycox, Collins, Marshall, Elliott, Zhou, Kanouse, Morrison, & Berry, 2001). This has led some observers (e.g., Gregerson, 2003) to go so far as to suggest that the extensive media coverage of 9/11 may have actually unwittingly furthered the goals of the terrorists.

In at least a few studies, media exposure following the attacks has similarly been treated as a correlate of general distress (e.g., Schlenger et al., 2002). For example, higher levels of television viewing on 9/11 were associated with greater personalized fear (including an individual’s belief about the likelihood of personal injury), which in turn was associated with behavioural changes on the days following the attacks (Powell & Self, 2004). Furthermore, during the ensuing anthrax attacks in the United States, initial

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6 Among various media outlets, television news coverage of 9/11 has been linked with the strongest emotional responses to the attacks (Cho, Boyle, Keum, Shevy, McLeod, Shah, & Pan, 2003).
(but not subsequent) exposure to the media coverage was a strong predictor of later distress (Dougall, Hayward, & Baum, 2005). These findings are consistent with earlier research, conducted in the aftermath of the Oklahoma City bombing, which found television viewing to be a significant predictor of post-traumatic stress in children seven weeks later (Pfefferbaum, Nixon, Tivis, Doughty, Pynoos, Gurwitch, & Foy, 2001). Unfortunately, few researchers have attempted a more sophisticated measure of media exposure. For example, only one reported study so far has examined differences in the emotional tone of television and newspaper reports of the September 11 terrorist attacks (Cho et al., 2003). A next step in this regard could be to study the different ways in which the news of the attacks was framed (alarmist versus conservative approaches, for example), and the different psychological implications that may have ensued. Similarly, it is also conceivable that a differential cognitive impact of the attacks on the various news anchors in turn mediated the impact of the attacks on viewers outside of the affected areas.

Although this introduction has so far focused on negative psychological consequences of terrorist attacks, it is important to recognize that reactions to trauma in general (including terrorist attacks in particular) are not unequivocally negative. Following previous calls for a “salutogenic” or health-enhancing (as against a solely

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The distinction between initial and subsequent television viewing is important because the association of distress with the former helps to rule out an alternative explanation for the results (i.e., that more-distressed people are more likely to seek out media exposure).
pathogenic or disease-oriented) perspective on stress (e.g., Antonovsky, 1979; O'Leary & Ickovics, 1995; Suedfeld, 1997; Seligman, 1998), over the last decade, researchers have also identified many positive effects of undergoing stress, including personal growth (Park, Cohen & Murch, 1996), meaning-making \(^8\) (Park & Folkman, 1997), benefit appraisals (Lazarus, 1999), and spiritual or religious transformation (Pargament & Park, 1997).

Even following the ghastly events of 9/11, many positive psychological outcomes have emerged, cementing the notion of human beings as a psychologically resilient species. For example, among a sample of US veterans already suffering from PTSD, a small but significant improvement in symptom levels was noted following 9/11 (Rosenheck & Fontana, 2003). This may not seem very remarkable, given the increased sense of community and patriotism in the aftermath of the attacks. However, a recent meta-analysis showed that previous mental illness and exposure to trauma reliably increase vulnerability to PTSD and predict post-disaster distress (Brewin, Andrews, & Valentine, 2000). Other noted positive effects include an enhanced feeling of subjective well-being (particularly among those more determined to find a sense of meaning), greater appreciation for and satisfaction with life (Holmes, 2005), a clearer sense of priorities (Davis & Macdonald, 2004), increased parental support (Gil-Rivas, Holman, & Silver, 2004), greater value of friends and family (Linley, Joseph, Cooper, Harris, &

\(^8\) Others (e.g., Taylor, Kemeny, & Reed, 2000) have also noted that cognitive processing, accompanied by a finding of meaning in the experience, is associated with positive health outcomes.
Meyer, 2003), gratitude towards rescue workers and the principle of freedom (Gordon, Musher-Eizenman, Holub, & Dalrymple, 2004), helping behaviours (Davis & Macdonald, 2004), and enduring character strength developments (Peterson & Seligman, 2003). Similar positive changes have also been documented within samples outside the United States, including in Canada (Davis & Macdonald, 2004), Britain (Linley, Joseph, Cooper, Harris, & Meyer, 2003), Sri Lanka (Dundes & Rajapaksa, 2004), and Japan (Kumagai & Ohbuchi, 2002), which further testify to the widespread impact of 9/11 media coverage.

As is evident from the discussion so far, there has been no shortage of research focusing on the psychological impact of September 11, 2001. In addition to what has been already mentioned, researchers have found that the post-9/11 world brought with it higher levels of American identification (Silver & Silver, 2003), religious attendance (Meisenhelder, 2002), prosocial behaviours (Pyszczynski, Solomon, & Greenberg, 2003; Wayment, 2004), support for President Bush and his counter-terrorism policies (Landau, Solomon, Greenberg, Cohen, Pyszczynski, Arndt, Miller, Ogilvie, & Cook, 2004), as well as increased aggression (Argyrides & Downey, 2004), shock, desire for revenge (Kaiser, Vick, & Major, 2004), survivor guilt (Wayment, 2004), perceived risk of terrorism (Huddy, Feldman, Capelos, & Provost, 2002), worry (Bergstrom & McCaul, 2004), personalized fear (Powell & Self, 2004), and incidents of racism and xenophobia (Pyszczynski, Solomon, & Greenberg, 2003; Scurfield, 2002). Coping mechanisms ranged from avoidance and denial to tunnel vision and task orientation (Scurfield, 2002).

However, despite the volume of published findings on the topic, two features characterize the majority of this body of research. One is an almost exclusive reliance
upon self-report methodology. As has been noted previously (e.g., Silver, 2004), most questionnaire-based research conducted on responses to traumatic events carries problems of small, non-representative samples in addition to the usual social desirability biases and reference group effects (Heine, Lehman, & Peng, 2002). These criticisms are especially valid with regard to studies of 9/11, the majority of which utilized samples of convenience and, most crucially, lacked a baseline measure of the variables under consideration.

A second feature of this literature is that all of the aforementioned studies measured their criteria (by necessity) in the days, weeks, months, or even years following 9/11. Thus far, no systematic effort has been made to understand the psychological impact of terrorist attacks along the much finer timeline of hours, minutes, or seconds. The present study is also aimed at filling this gap in the literature.

**Cognitive Management**

As human beings with innate limitations to our information processing ability, we employ several methods in order to circumvent these constraints, including chunking similar information together and using decision-making heuristics, stereotypes, and schemas (Suedfeld, 1992; Tversky & Kahneman, 1981). However, even with the use of these mental strategies, when the operating capacity of our working memory and attention is monopolized by extraneous factors, the limitations become even more pronounced. Such factors can include stress, fatigue, illness, information over- or underload, and time pressure (Suedfeld, 1992). One of the principal methods developed to assess our state information processing ability is the construct of integrative complexity.
Integrative complexity is a measure of language structure that assesses the degree to which an individual's current thinking demonstrates "differentiation" and "integration" of ideas. Differentiation is defined as the extent to which a person is able to recognize two or more distinct alternatives or dimensions within a given topic (without discounting the legitimacy of either), whereas integration refers to the extent to which these differentiated perspectives are recognized as interdependent, subsumed within an overarching strategy, or tied together in some other way (see Baker-Brown, Ballard, Bluck, de Vries, Suedfeld, & Tetlock, 1992). Integration, of course, cannot exist without differentiation. Integrative complexity is scored on a 1-7 scale, with 1=no differentiation, 3=clear differentiation, 5= differentiation with low level integration, and 7=high-level integration within a superordinate conceptual schema. Even numbers indicate some evidence of the next higher level, but not clear enough evidence to warrant the higher score.

A related notion is that of an individual's relatively stable, trait level of complexity, referred to as "conceptual complexity" (Schroder, Driver, & Streufert, 1967).

The following are sample paragraphs from the present data-set that reflect integrative complexity scores of 1, 2, and 3 (no higher scores were assigned in this study). Brief explanations for each score appear in parentheses following each paragraph.

Score of 1: It is completely impossible to understand why this is happening and to figure out what the--what in the world is going on. (One-dimensional statement, with no evidence of either differentiation or integration).
The dominant theory of integrative complexity is known as the cognitive manager model (Suedfeld, 1992). According to this model, the level of complexity of thought achieved is directly related to the cognitive resources invested in the task. A “good cognitive manager” is able to allot a justifiable proportion of resources for a given problem (Suedfeld & Tetlock, 2001). The model likens the cognitive reaction to stressful situations to Selye’s (1956) General Adaptation Syndrome: i.e., proceeding through the stages of alarm (recognizing the challenge), resistance (muster ing the required proportion of resources), and exhaustion (when cognitive resources are depleted due to a “disruptive” level of stress; Suedfeld, Guttieri, & Tetlock, 2003). Thus, if the challenge is “too severe, too persistent, occurs simultaneously with too many other demands, or if cognitive resources are depleted through fatigue, illness, fear, or other adversities, complexity decreases” (Suedfeld & Tetlock, 2001, p. 294). Consistent with this model,

Score of 2: You mentioned earlier that, of course, as we all know, years ago there was that terrorist attack. It took place down on the ground and in the underground levels, in the garage levels. But, again, that’s not to imply that we have any reason at this point to believe that this is--this is terrorism or not. We simply don’t know. (Increased tolerance for ambiguity, reflecting low level differentiation, but no integration).

Score of 3: And xxx, it’s important to note that if these planes were hijacked, if they were carrying passengers, there isn’t much military officials could have done. You can’t shoot down a plane like that for risk of the people on board, plus, for the injuries you could cause on the ground in a place like Manhattan. (Multiple dimensions recognized, revealing clear differentiation, but still no integration).
previous research has shown integrative complexity to be affected by situational variables including cognitive load, emotional arousal, stress, uncertainty, accountability, fatigue, and illness (Suedfeld & Granatstein, 1995; Suedfeld, Guttieri, & Tetlock, 2003; Tetlock, 1986).

Integrative complexity is also moderated by emotional involvement in the task at hand (with increased emotional involvement, the use of more cognitive resources can be justified, as per the cognitive manager model; Suedfeld, Bluck, & Ballard, 1994). This relationship only holds up to a point, however. If emotional arousal surpasses an optimal level, it has a deleterious effect on integrative complexity (disruptive stress hypothesis). Another important moderating factor sometimes (although not always) closely tied to emotional involvement is the psychological distance between the individual and point of reference (Suedfeld, Bluck, & Ballard, 1994). Specifically, lower psychological distance has been related to more unidimensional thoughts and feelings. In the case of September 11, 2001, individuals with greater personal involvement in the attacks (defined as having personally known victims of the attacks or having lived in the affected areas) recalled being more shocked and upset upon hearing about the attacks (Fivush, Edwards, & Mennuti-Washburn, 2003). These same individuals used fewer words indicative of cognitive processing (e.g., comprehend, realize, understand) and positive emotion (e.g., happy, pleased, joyful) in expressive writings 2-3 months following 9/11. Conversely, 11

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11 This finding is particularly relevant given that Suedfeld and his colleagues have shown that personal writings that reflect on past stressful events evidence the same
in the Middle East, greater ideological distance from the United States was associated with more approval of the attacks (Haddad & Khashan, 2002; Sidanius, Henry, Pratto, & Levin, 2003).

Integrative complexity scoring has been employed successfully in a number of applied contexts, including studies of political decision-making during times of international crisis. The typical research paradigm involves scoring speeches made by specific individuals through a period of six months or even several years, and plotting changes in mean complexity scores on a timeline of events. Research in this vein has shown that complexity scores tend to follow predictable patterns in relation to external events. For instance, in studies of countries involved in long-term disputes, sustained bilateral increases or decreases in complexity levels are associated with the resolution of a tense standoff through negotiation or armed conflict, respectively (e.g., Suedfeld, Tetlock, & Ramirez, 1977; Suedfeld, Jhangiani, & Weiszbeck, 2003).

Tetlock (1985) has argued that a deliberate manipulation of one’s integrative complexity level could explain many of the observed changes (for example, it can be beneficial to depict oneself as rigid and uncompromising in certain situations, or even appear reasonable and open to negotiation in others). As has been mentioned previously (e.g., Suedfeld, Guttieri, & Tetlock, 2003), this hypothesis is difficult to test; nonetheless, it is our view that the content of speech is much more open to manipulation than is its variations in the integrative complexity of the writer (albeit at a higher overall level) that occurred when those events actually took place (Suedfeld & Granatstein, 1995).
structure. In fact, an “impression management” explanation becomes increasingly untenable when one considers certain previous findings:

1) Surprise military attacks have been shown to be preceded by a drop in the integrative complexity of the leader of the attacking nation (although not by the leader of the country under attack; Suedfeld & Bluck, 1988). Common sense would dictate that, were a leader truly planning to launch a “surprise” unilateral attack, they would not want to reveal this intention beforehand.

2) Studies comparing the public speeches and private writings of prominent figures do not consistently reveal the difference in integrative complexity one would anticipate if impression management was the predominant strategy used when speaking in public (e.g., Tetlock & Tyler, 1996).

3) The decrease in integrative complexity predicted by the disruptive stress hypothesis has been found during times of societal crisis not only in the speech of national leaders, but also in the writings of novelists and scientists. The latter group, it may be argued, have no logical reason to deliberately convey a less-complex image of themselves (Porter & Suedfeld, 1981; Suedfeld, 1985).

Even while one cannot entirely dismiss the impression management hypothesis, it seems reasonable to conclude that any such efforts to deliberately manipulate one’s level of complexity (just like any other strategy employed by a good cognitive manager) would be overwhelmed by the impact of a severe or disruptive level of stress (such as during a terrorist attack). In fact, according to Suedfeld and his colleagues,

when one’s entire nation is at risk, the combined effects of personal and societal upheaval (and perhaps a lesser sense of control) may lead to a level of emotional
arousal that surpasses some optimal point and interferes with information processing complexity. (Suedfeld, Bluck, & Ballard, 1993, p. 445)

"Integrative" complexity, however, is so termed because it is not only a function of environmental characteristics, but also individual capabilities. Conceptual (trait level) complexity is correlated with intelligence and verbal fluency, with correlations ranging between .10 and .45, depending on the intelligence test used or criterion measured (Schroder, Driver, & Streufert, 1967; Coren & Suedfeld, 1992). Other, dispositional, correlates of conceptual complexity include authoritarianism, dogmatism, power-motivation, and need for closure (all negatively correlated), as well as openness, creativity, need for cognition, and moral development¹² (all positively correlated; Suedfeld & Tetlock, 2001).

¹² It is important to note that the heuristic of equating higher complexity with better judgment or moral superiority is scientifically baseless. To illustrate this point, Tetlock and his colleagues give the example of the integratively simple abolitionists of the 1850s who demanded an end to slavery at all costs (versus more-complex Democratic and Republican moderates; Tetlock, Armor, & Peterson, 1994). Another example comes from an analysis of the speeches made by both Hitler and Chamberlain at the 1938 Munich conference, which reveals Chamberlain’s complexity to have been consistently higher than that of his counterpart (Suedfeld, 2003). In sum, higher or lower complexity in and of itself is value-neutral, and either one may prove more successful in a given situation.
This ability to capture both individual differences as well as situational influences renders integrative complexity a particularly appropriate measure in the present study.

*Terror Management*

One of the most empirically productive theories in recent social psychology has been terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986, 2003). Stemming from the work of the anthropologist Ernest Becker, TMT presupposes that, beneath the surface, we are constantly in fear of our own eventual demise. The resulting existential anxiety we unconsciously experience is controlled or "managed" through finding meaning in our lives. At a super-ordinate level, this personal sense of meaning extrapolates to collective sets of beliefs and symbols, or cultures. Said differently, cultures provide structure and meaning to our lives. In doing so, they simultaneously provide a buffer against any existential angst that might otherwise accompany the reality of our mortality.

The classic TMT paradigm elicits the individual's fear of death through what is known as a "mortality salience" condition. Subjects are exposed to some seemingly mundane task that serves the indirect function of reminding them of their eventual death. Previous research has found that this simple procedure elicits, among other things, a heightening of prejudices and of patriotism, the awarding of stiffer sentences for prostitutes and greater rewards for heroic behaviour, more positive evaluations of those who validate one's worldview and more negative evaluations of those who criticize it (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989; Greenberg et al., 1990, 2003). In other words, when reminded of our own mortality, we tend to cling more
strongly to tenets and symbols of our cultural worldview while derogating those who do not share the same outlook.

From a cognitive standpoint, TMT posits the existence of proximal and distal defences against death-related thoughts. The former are believed to promote the active suppression of the unwanted thoughts, removing them from one’s focal awareness. The latter are believed to subsequently operate on these still-accessible thoughts (now residing outside of working memory), in the form of the mortality salience (MS) effects. In support of this notion, the MS effects are only observed after a delay, which is presumed to be the time required by proximal defences to actively suppress mortality salient cognition (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Increasing cognitive load (and thereby draining mental resources) has been shown to effectively sabotage subjects’ proximal defences, resulting in immediate MS effects (Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997). High accessibility of death-related thoughts is thus currently understood by the authors of TMT as both a necessary and sufficient precondition for the worldview defence reaction (Pyszczynski, Solomon, & Greenberg, 2003). This is one of the key factors that distinguishes TMT from other theories that predict a similar strengthening of ingroup-outgroup boundaries in the face of threat (e.g., social identity theory; Tajfel & Turner, 2004).

A terrorist attack constitutes an especially gruesome and frightening assault on one’s cultural worldview, while at the same time serving to prime death-related thoughts. In other words, it functions as a large-scale mortality salience prime, in response to which TMT predicts a strong and immediate worldview-defensive reaction. Following September 11, 2001, ample support was found for this prediction in both the forms of
ingroup bolstering (e.g., increased American identification, Silver & Silver, 2003; Kumagai & Ohbuchi, 2002; support for President Bush and his counterterrorism policies, Landau et al., 2004), as well as outgroup derogation (e.g., intensified bigotry and suppression of dissent; Pyszczynski, Solomon, & Greenberg, 2003; Scurfield, 2002). Even subliminally exposing individuals to 9/11-relevant stimuli in experimental situations has been shown to provoke mortality-salient cognition (Landau et al., 2004).

For the most part, studies of TMT have measured death-related thoughts by using word-completion tasks. Theoretically, however, one should also be able to detect these effects using more implicit measures of cognition (Pyszczynski, Solomon, & Greenberg, 2003), such as the implicit association task (IAT; Greenwald, McGhee, & Schwartz, 1998) and the content analysis of speech or writing (Groom & Pennebaker, 2002). The present study represents the first known attempt to use content analysis to test the predictions of TMT, through measuring death-related cognition as well as the most prominent affective components of worldview defence, namely anxiety and anger. Specifically, by using a natural, quasi-experimental, and archival approach, we take advantage of the widespread media coverage of the 9/11 terrorist attacks in order to investigate the psychological (cognitive and emotional) reactions of individuals with different cultural backgrounds, as they occurred. Predictions stemming from both the cognitive manager model of integrative complexity and terror management theory are tested.
CHAPTER 2  
METHODOLOGY

Transcripts of the live television news footage from the morning of September 11, 2001 serve as source material for this study. These transcripts are well suited for content and structural analyses because: 1) live coverage began after the first plane crashed into the World Trade Centre (WTC) in New York, yet before all other crashes, resulting in a gradual and on-camera comprehension of the malicious nature and severity of the attacks, and 2) by virtue of their task, news anchors were required to supplement the video footage with their own continual commentary. Transcripts were obtained for the period beginning approximately 10 minutes prior to the breaking-news coverage, until approximately 2 hours after live coverage began (i.e. from 8:35am until 10:45am, EST). Footage\(^\text{13}\) or transcripts were obtained either from the Vanderbilt television news archive (Nashville, TN), the Lexis-Nexis academic online database, or directly through approaching television networks in the United States (ABC, NBC, CBS, CNN), Canada (CBC), and the State of Qatar (Al-Jazeera). The rationale behind the selection of these three countries was to provide comparison groups from cultures with generally different, as well as largely comparable, world views\(^\text{14}\).

\(^{13}\) Where transcripts were not directly available, video footage was obtained and transcribed.

\(^{14}\) Efforts were, and continue to be, made to obtain footage or transcripts from other nations, including Israel, India, the U.K., Spain, and Australia. Data from Israel in particular could shed light on the impact of the 9/11 attacks in a country in the Middle
In every case, information revealing the identity of the news anchor and the respective network was removed from the transcripts, which were subsequently coded by qualified scorers for integrative complexity according to the criteria listed in the scoring manual (Baker-Brown et al., 1992). Ten percent of the scored paragraphs were additionally scored by a second qualified complexity scorer\(^\text{15}\) in order to assess inter-judge reliability, which was found to be .86. The complexity scores of the news anchors from all three countries were juxtaposed on a timeline of events from the morning of 9/11. Using this methodology, we were not only afforded the opportunity to study the effects of the attacks on the cognitive processing of television newscasters, but were also able to compare these effects across news anchors with different cultural backgrounds.

Transcripts from the US news networks included commentary by news anchors in the studio as well as reporters on location at the site of the attacks in New York and Washington, D.C. The speech of both these groups was scored for integrative complexity, in order to reveal the effect of physical proximity to the attacks (with the resulting consequences on fear for personal safety, arousal, and so on) on cognitive processing.

\(^{15}\) Defined as someone having achieved a reliability of 0.85 or greater with an expert scorer.
Content Analyses

A relatively new weapon in the arsenal of available content analysis techniques is the software program Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001). LIWC is capable of scanning text files for words related to 70 linguistic dimensions, ranging from words indicating causal reasoning (e.g., because, cause, effect) to negative and positive emotion-related words, and references to God or religion. A recent study by the author of the program analyzed entries into internet journals during the days immediately following September 11, 2001, and found evidence for increased cognitive processing\(^\text{16}\) and psychological distancing within the first two weeks following the attacks (Cohn, Mehl, & Pennebaker, 2004). In addition, these same subjects’ emotional positivity (operationalised as the difference between the percentages of positive and negative emotion words\(^\text{17}\)) fell during the first two days following the attacks, only gradually recovering to baseline levels. Consistent with the studies mentioned earlier, the sharpest drops in emotional positivity were found among those who were the most preoccupied with the terrorist attacks in the weeks after.

\(^{16}\) Defined here as concern with organizing and intellectually understanding issues at hand, and measured through the use of words such as think, question, and because.

\(^{17}\) Taking into account both positive and negative affect provides a more holistic view of emotional processing, and is congruent with Folkman and Moskowitz’s (2000) observation that positive emotion can co-occur with distress, sometimes serving as a buffer against the negative outcomes of stress.
As with archival analysis techniques in general, the versatility of LIWC enables virtually unlimited research questions to be addressed. What makes the program particularly attractive for use in this study is that it can function as a relatively simple-to-use, content-based partner to the (considerably more time-intensive) structural analyses involved in the scoring of integrative complexity. The general benefits of such a triangulation of research methods have been expounded previously (e.g., Crano, 1981). In fact, integrative complexity analyses have frequently been partnered with other, complementary, archival research techniques with a view to obtain a multidimensional picture of cognitive processing. For instance, research on crisis decision-making has demonstrated a potentially important relationship between integrative complexity and motive imagery\(^\text{18}\) (Winter & Bryant, 2003).

The news transcripts from the morning of September 11, 2001 were scanned into the LIWC program in order to measure negative emotion, emotional positivity (as defined earlier), linguistic indicators of anxiety and anger, and references to death\(^\text{19}\). It is assumed that the use of negative emotion-related words (or scores on emotional

\(^\text{18}\) The motive imagery scoring technique can be used to measure the prevalence of the power, achievement, and affiliation motives in verbal passages (Winter, 1991).

\(^\text{19}\) In a similar vein, a commonly-used manipulation check for the mortality salience condition involves a word completion task that provides subjects with the opportunity to complete word fragments such as “COFF__” as innocuous words such as COFFEE, or death-related words such as COFFIN (see Pyszczynski, Solomon, & Greenberg, 2003).
positivity) functions as a proxy measure of the level of emotional arousal experienced by the subjects in this study. Similarly, counting anxiety and anger-related words is assumed to capture at least a part of any existential tension or worldview threat experienced by the news anchors.

For comparative purposes, the transcripts were divided into the following time segments: 1) Baseline, 2) Breaking news of the first plane crash, 3) The second plane crash into the WTC, 4) Breaking news of the plane crash at the Pentagon, 5) The collapse of the first WTC tower, and 6) The collapse of the second WTC tower.

Although this is largely an exploratory study, a few specific hypotheses are offered:

1. It is predicted that drops in the level of integrative complexity will coincide with: a) breaking news of the terrorist attacks, b) the crash of the second plane into the WTC South Tower (when, for most, intuitive confirmation of the malicious nature of the attacks occurred), c) the plane crash at the Pentagon, and d) the collapse of each of the WTC towers. Implicit in this hypothesis is the assumption that each subsequent event during the attacks will be associated with an increase in (predominantly negative) emotional arousal.

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20 Anger, in particular, is often used as a dependent variable to measure the effects of a mortality salience manipulation (e.g., van den Bos, Poortvliet, Maas, Miedema, & van den Ham, 2005).
2. Stemming from the predictions of TMT, it is also expected that linguistic indicators of anxiety and anger will show positive relationships to references to death.

3. As a result of greater psychological, ideological, and geographical distance (and presumably less emotional involvement), it is expected that the speech of the newscaster from Qatar will evidence a lesser drop in integrative complexity, as well as less anxiety or anger, than the newscasters from either the United States or Canada.

4. Finally, it is assumed that direct exposure to a terrorist attack is considerably more stressful than vicariously witnessing such an event through the lens of television. As a result, it is expected that US reporters will show more pronounced decreases in integrative complexity than US news anchors, but only following major incidents at their location.
CHAPTER 3

RESULTS

*Integrative Complexity*

Integrative complexity scores for all networks (ABC, NBC, CBC, & Al-Jazeera) are shown in Figure 3-1. Data from CNN and CBS were excluded from the integrative complexity analyses because too few paragraphs (≤5 per stage) were found to be scorable according to the criteria listed in the scoring manual (see Baker-Brown et al., 1992).

A 5 (News Anchor) x 6 (Stage) ANOVA was conducted, with News Anchor and Stage both treated as between-subjects factors\(^\text{21}\) (see Table 3-1). Significant main effects were found for both News Anchor \([F(4,214) = 4.17, p = .003]\) and Stage \([F(5,214) = 3.50, p = .005]\). However, using a more liberal type 1 error cutoff, a significant interaction between News Anchor and Stage also emerged \([F(12,214) = 1.57, p = .10]\). For each anchor, simple main effects tests were performed to determine whether integrative complexity scores differed significantly across stages.

\[^{21}\text{Although “Stage” ought to be treated as a within-subject factor, the insufficient degrees of freedom resulting from what are effectively multiple case-studies precluded such an analysis. It should be noted that treating stage as a between-subjects factors significantly reduces the power of this test, and all results should be interpreted in this light. Effect sizes (}\eta^2\text{) provide a more objective indicator of relationship strength.}\]
Figure 3-1: Mean changes in integrative complexity across all news networks
Table 3-1: Test of the effects of news anchor and stage on integrative complexity

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>News Anchor</td>
<td>6.100</td>
<td>4</td>
<td>1.525</td>
<td>4.170</td>
<td>.003</td>
</tr>
<tr>
<td>Stage</td>
<td>6.402</td>
<td>5</td>
<td>1.280</td>
<td>3.501</td>
<td>.005</td>
</tr>
<tr>
<td>News Anchor x Stage</td>
<td>6.899</td>
<td>12</td>
<td>.575</td>
<td>1.572</td>
<td>.102</td>
</tr>
<tr>
<td>Error</td>
<td>70.581</td>
<td>193</td>
<td>.366</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>93.553</td>
<td>214</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3-1: Test of the effects of news anchor and stage on integrative complexity
Starting with the US newscasters, a simple main effects test for Gibson (ABC) attained statistical significance \( [F(2,16)=8.71, \; p=.003; \; \eta^2=.55] \). Tukey tests revealed that his baseline level of integrative complexity was significantly higher than either of the two stages following breaking news of the attacks \( [p's = .006 \text{ and } .01 \text{ respectively}] \). A simple main effects test for Jennings (ABC) also reached significance \( [F(3,72)=3.14, \; p=.03; \; \eta^2=.12] \). Post-hoc testing showed that only his rise in integrative complexity following the collapse of the second WTC tower approached significance \( [p=.06] \). Finally, a test of the effect of stage on Couric’s (NBC) level of integrative complexity was statistically significant using a more liberal \( p \) value \( [F(5,41)=2.01, \; p=.10; \; \eta^2=.22] \). There were no significant changes across stages.

For the Canadian news anchor (Kelley, CBC), a simple main effects test also attained statistical significance \( [F(5,47)=4.82, \; p=.001; \; \eta^2=.37] \). Tukey tests showed his baseline level of integrative complexity to be significantly higher than following the second crash at the WTC \( [p=.03] \), or following the collapse of the first WTC tower \( [p=.001] \).

A simple main effects test for Hafeez (Al-Jazeera) was not statistically significant \( [F(2,34)=.10, \; p=.91; \; \eta^2=.01] \).

Even where statistical significance was not attained, trends were largely in the hypothesized direction. In fact, Figure 3-1 reveals a remarkably consistent pattern for the news anchors from the United States and Canada.

**Negative Affect**

Scores for negative emotion word-use are shown in Figure 3-2. Again, a reasonably consistent pattern emerges across all four news networks, in that the use of
negative emotion words tended to increase following the crashes at the WTC, universally
decrease following news of the crash at the Pentagon, and rise again as each of the WTC
towers collapsed. Because LIWC scores for each stage represent the proportion of words
used in the chosen category, and because each score represents only one speaker, there is
no variance to speak of within the cells of this factorial design. As a result, conventional
statistical testing cannot be performed. Instead, mean change scores (from each
immediately prior stage) were computed for both negative emotion and integrative
complexity in order to provide a standardized basis on which to investigate any
systematic relationship between the two variables. These scores, collapsed across all
news anchors, are shown in Figure 3-3. Taken together, the integrative complexity and
negative emotion word-use scores appear to share a largely negative (if not statistically
significant) linear relationship \[ r(6) = -0.40, p = 0.43 \], that is even stronger in the case of the
North American news anchors taken alone \[ r(6) = -0.51, p = 0.31 \]. In other words, when
integrative complexity rose, the use of negative emotion words fell, and vice-versa,
particularly for those assumed to experience lower psychological distance and higher
emotional involvement in the attacks. This confirms the assumption underlying the first
hypothesis, even if each stage was not associated with the predicted drop in integrative
complexity.
Figure 3-2: Negative emotion word-use across all news networks
Figure 3-3: Mean change scores of integrative complexity and negative emotion word-use collapsed across all news anchors.
Emotional Positivity

As seen in Figure 3-4, emotional positivity drops initially following breaking news of the crashes at the WTC, and gradually recovers following news of the Pentagon crash. Mean change scores for emotional positivity and integrative complexity are depicted in Figure 3-5. As might be expected, integrative complexity and emotional positivity are positively (but not significantly) related \([r(6)=.49, p=.32]\), with this relationship again being stronger among the four North American news anchors \([r(6)=.59, p=.21]\). In other words, the higher the level of integrative complexity, the more positive the content of the statements made by the newscasters, and vice-versa. There was no direct relationship between the use of positive and negative emotion-related words \([r(6)=-.01, p=.99]\).

Death-related Words, Anxiety, and Anger

The pattern of use of death-related words during the terrorist attacks appears to have been relatively uniform for all of the newscasters, in that their frequency universally increased following the second crash at the WTC and the collapse of the first tower, and decreased in between, following the crash at the Pentagon (see Figure 3-6).

For the purposes of terror management theory, however, what is more interesting are the relationships between the use of death-related words and linguistic markers of anxiety. Among the US newscasters, significant and very high positive correlations emerged for Gibson and Couric \([r(3) = .98, p=.06, \text{one-tailed}; r(6) = .79, p=.03, \text{one-tailed}]\), but not for Jennings \([r(4)=.25, p=.38, \text{one-tailed}]\). The overall correlation obtained among US newscasters was nonetheless significant \([r(13)=.47, p=.05, \text{one-}\)
Figure 3-4: Emotional positivity across all news networks
Figure 3-5: Mean change scores of integrative complexity and emotional positivity collapsed across all news anchors
Figure 3-6: Death-related word-use across all news networks
tailed]. A weaker (but still moderate) relationship was present in the speech of the newscaster from Canada \( r(6)=.51, p=.15, \text{one-tailed} \). In the case of the Arabic newscaster, a non-significant negative correlation was observed between anxiety and the use of death-related words \( r(3)=-.40, p=.37, \text{one-tailed} \). Figure 3-7 summarizes these results.

Consistent with previous experimental studies, an even stronger effect supporting TMT's predictions was found in the relationship between the use of death-related words and linguistic markers of anger. Significant linear relationships were found for Gibson and Couric \( r(3)=1.00, p=.03, \text{one-tailed}; r(6)=.93, p=.003, \text{one-tailed} \), but not for Jennings \( r(4)=.70, p=.15, \text{one-tailed} \). Once again, the average correlation among US newscasters was significant \( r(13)=.69, p=.004, \text{one-tailed} \), with this relationship tapering off for the newscaster from Canada \( r(6)=.34, p=.26, \text{one-tailed} \), and absent entirely in the speech of the Arabic newscaster \( r(3)=-.02, p=.49, \text{one-tailed} \). Figure 3-8 summarizes these results.

**US Reporters**

Using the same criteria as with the speech of the news anchors, only three reliable data points were obtained for US news reporters. One represents the integrative complexity of Dahler (ABC), during the period following the crash of the first plane at the WTC, and two represent the integrative complexity of Miklaszewki (NBC), during the periods following the second crash at the WTC, and the crash at the Pentagon (Dahler reported from the area around the WTC in New York, while Miklaszewki was reporting from outside the Pentagon in Washington, D.C.). A 2 (Location) x 6 (Stage) ANOVA showed a significant main effect of stage \( F(5, 151)=2.62, p=.03, \eta^2=.84 \), qualified by a
Figure 3-7: Anxiety and death-related word-use collapsed among US newscasters
Figure 3-8: Anger and death-related word-use collapsed among US newscasters
significant interaction between location (broadcasting from the studio versus reporting from the site of the attacks) and stage \( F(2, 151)=4.10, p=.02, \eta^2=.54 \) (see Table 3-2). Following the first plane crash at the WTC, Dahler evidenced significantly lower complexity than the US news anchors \( t(19)=1.76, p=.05, \) one-tailed. As well, in contrast to all of the North American news anchors, Miklaszewki’s integrative complexity dropped, following the crash at the Pentagon (see Figure 3-9).
Figure 3-9: Integrative complexity of the US news anchors versus reporters
## RESULTS

### Table 3-2: Test of the effects of location and stage on integrative complexity (US only)

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>.952</td>
<td>1</td>
<td>.952</td>
<td>2.492</td>
<td>.117</td>
</tr>
<tr>
<td>Stage</td>
<td>5.003</td>
<td>5</td>
<td>1.001</td>
<td>2.619</td>
<td>.027</td>
</tr>
<tr>
<td>Location x Stage</td>
<td>3.135</td>
<td>2</td>
<td>1.567</td>
<td>4.103</td>
<td>.019</td>
</tr>
<tr>
<td>Error</td>
<td>54.632</td>
<td>143</td>
<td>.382</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>63.467</td>
<td>151</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: Integrative Complexity
CHAPTER 4
DISCUSSION

Two of the three news anchors showed decreases in integrative complexity when news broke regarding the first plane crash into the WTC, providing partial support for the first hypothesis. The single exception to this pattern was the case of Couric (NBC), which is likely the result of a floor effect. In fact, Couric’s mean integrative complexity at baseline was a score of 1.0 (on a 1-7 scale). To put it simply, during the following stage, Couric’s complexity could not possibly have decreased any further. Clues of another possible reason for this exception lie in the content of Couric’s thoughts during the stage following the first plane crash in New York: A look at the NBC transcript confirms that their initial assumption (unlike any of the other networks) was that “a small commuter plane” had “accidentally” collided with the WTC22 (Couric, 2001). The crash of the second plane twenty minutes later, however, removed any such hope. The shock and stress accompanying the witnessing of this second crash is likely what led to a further drop in complexity at this stage across all three North American news networks, providing additional support for the first hypothesis.

The universal gain in complexity following breaking news of the attack on the Pentagon is particularly interesting because it contradicts the initial hypothesis, which assumed each stage would (somewhat linearly) increase the amount of stress experienced. However, the cognitive manager model also predicts that more-complex situations justify

22 Gregerson (2003) has also specifically noted Couric’s failure to grasp the severity of the situation early on.
a greater investment of cognitive resources, which would result in an observed increase in integrative complexity. Thus, it may well be that, in the minds of the newscasters, the crash at the Pentagon introduced a new element that significantly complicated the nature of the occurring events (it was at that moment clear that the United States as a whole, and not just New York, were under concerted attack, and that key symbols of US economic and military power were the chosen targets). The gain in integrative complexity at this stage, therefore, may reflect efforts to cope cognitively with an increasingly complicated challenge. It is important to note that this stage was also associated with a universal decrease in the use of negative emotion-related words. To the extent that this dependent measure captures negative emotional arousal, the unexpected results actually provide additional support for the disruptive stress hypothesis, in that greater negative emotional arousal was associated with lower integrative complexity.

After the collapse of the first WTC tower, complexity universally decreased yet again (with a concurrent rise in negative emotion), effectively erasing any previous increases following the news from the Pentagon. This again is consistent with the belief

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23 Pennebaker (1989) also writes that, when under stress, individuals are less likely to engage in reflective (what he terms “high-level”) thought. In addition, because reflective thinking is associated with negative affect, he suggests that people may deliberately shift to a lower level of thinking in the face of stress (particularly major uncontrollable stressors) in order to avoid any accompanying negative affect. His (content-based) definitions of “levels of thinking,” however, are not conceptually related to integrative complexity.
that the collapse of the first WTC tower was yet another horrifying spectacle that could not have been anticipated, and therefore would lead to a sharp increase in the amount of stress experienced along with a temporary drain on information processing resources.

Finally, following the collapse of the second WTC tower, all three North American news anchors showed increases in complexity. While this was also not predicted by the first hypothesis, it is possible that, given the amount of time that had passed from the start of the attacks (1 hour 42 minutes from the first crash, and 29 minutes from the collapse of the first tower), this may reflect the beginning of a cognitive coping process. Specifically, news anchors at this stage may have begun to attempt to understand and find meaning in the attacks, through integrating them into (or modifying) existing cognitive schemata. This explanation can be tested by conducting a follow-up study and obtaining transcripts from beyond this stage, in order to check for a continued regression to baseline levels of integrative complexity.

Overall, for two out of five stages, the first hypothesis did not receive support. In fact, a pattern opposite to that which was expected emerged. However, even during these exceptional stages, the relationship between integrative complexity and emotional positivity provides strong support for the disruptive stress hypothesis. The null hypothesis (which predicted no changes in integrative complexity during the attacks) was not supported at any stage (with the exception of the news anchor from Qatar).

With hindsight, it is clear that the initial (directional) hypothesis was not sensitive to qualitative differences between each pair of successive events during the 9/11 attacks. Given the exploratory nature of this study, however, what is more important is to be able
to provide a logical rationale for the unexpected effects observed. The disruptive stress model provides this explanation.

The consistency among the observed patterns of integrative complexity of the four news anchors from the US and Canada suggests that the situation contained a powerful enough influence to supercede any major individual differences in cognitive style. The remarkable degree of convergence also indicates that the effects are not random, and effectively represent three replications of the same pattern. On the other hand, the integrative complexity of the news anchor from Al-Jazeera was a striking exception to the rule. In his case, statistical testing failed to show any significant changes across the three stages for which data were obtained, supporting the first null hypothesis as well as the third hypothesis concerning the effects of psychological and ideological distance. Effect sizes for stage ranged from .12 to .55 for the US, and .37 for the Canadian news anchors, to .01 for the news anchor from Qatar. Among the US news

24 This result is qualified by the lack of available data for the Arabic newscaster during the baseline period and the stages following the collapse of the first WTC tower, which is when the greatest changes in integrative complexity occurred for the North American newscasters.

25 The cultural difference found in this study is not likely an artifact of the use of different languages, nor the process of translation. Previous studies have comprehensively answered this question by having integrative complexity scored in the foreign language by a native speaker, with a subset of the paragraphs translated into English and scored again to assess inter-judge reliability (e.g., Suedfeld & Rank, 1976).
anchors, the smallest effect size was obtained for Jennings ($\eta^2 = .12$), who was the only anchor not present and on-air during the breaking news of the attacks or the second crash at the WTC site. In his case, it could be that having time to absorb and adjust to news of the attacks provided him with a greater level of emotional detachment and objectivity than the other news anchors were afforded, tempering the severity of his cognitive reaction, and reducing the frequency of polarized scores at each stage.

It is conceptually and clinically interesting that the pattern of integrative complexity exhibited by Kelley (CBC) so closely mirrored that of the three US newscasters. This finding is consistent with previous research in that it supports the idea that vicariously witnessing a large-scale stressor such as a terrorist attack can be stressful and carries cognitive implications, even for individuals from untargeted areas. The severity of the Canadian newscaster’s reactions can be explained by the cultural, ideological, and even geographical proximity of the two countries (the events may have been conceived as an attack on the psychological in-group, however defined). Future case studies (including of, for example, news anchors from Israel and Britain) will provide important insights into whether variables such as cultural identity, ideological distance, or previously existing terrorism schemata can moderate these effects.

Cross-culturally, the patterns of LIWC scores for negative emotion-related words showed more consistency than was the case with integrative complexity. This is an

This procedure has never revealed significant differences between the two sets of scores, and demonstrates that integrative complexity scoring can be reliably applied to any language.
important finding because it highlights integrative complexity's potential to reveal qualitative differences in how individuals are thinking even if what is being said may largely be the same.

While it is impossible to know the extent to which any of the newscasters were actively engaging in impression management during their reports of the attacks, to the extent that this did occur, it provides a potential explanation for the content-based consistency. Having said this, there was also noticeably more variation in the absolute scores for negative affect at and across stages than was the case with integrative complexity. A possible reason for this might stem from the scoring procedure employed. Whereas scoring text for integrative complexity is a time-consuming task that requires rigorous training, scanning text files with the LIWC software is a comparatively quick and crude method of analyzing speech. For example, LIWC is easily “fooled” by the use of double-negatives, clichés, and straw-man arguments, is limited by its internal dictionary, and does not take into account the context in which particular words are used.

In order to assess the prevalence of coding errors committed by the LIWC software program, ten percent of the transcripts (approximately 3000 words) were also analysed manually. Identified errors included false positives such as “good-size plane” and “Good Morning America” (coded by LIWC as positive affect) and “I saw, seriously, these girls . . . getting botox in their head” (coded by LIWC as negative affect), as well as words such as “casualties” and “fatalities” not being counted as references to death. Based on this subset, the error rate of LIWC was estimated as 0.33%, which is significant, given that the range of LIWC scores was very small for all variables (0-2% for negative affect; 0-0.3% for death-related words; 0-0.8% for anxiety and anger-related
words). Yet, despite these shortcomings, a reasonably consistent pattern emerged across all news anchors.

The use of death-related words peaked at the same time points for all news anchors. This inadvertently established more control for the test of the TMT hypothesis, as variations in anxiety and anger could also be compared directly across individuals. As predicted, both measures (but especially anger) showed strong positive relationships with the use of death-related words for US newscasters (whose worldviews were under most direct attack). This relationship was weaker in the case of the Canadian newscaster, and did not exist at all for the Arabic newscaster, despite the fact that the latter exhibited the highest absolute scores for death-related words. While the appearance of death-related words, or even their co-occurrence with anxiety or anger itself, should not be particularly surprising (after all, witnessing mass death is stressful), that the relative strengths of these relationships so clearly mapped onto the predicted cultural differences provides support for the TMT hypothesis.

A recent study by van den Bos and his colleagues, however, showed that evoking a feeling of uncertainty through the violation of cultural norms produces a much more powerful worldview defence than do reminders of an individual’s eventual death (van den Bos, Poortvliet, Maas, Miedema, & van den Ham, 2005). Specifically, subjects in “uncertainty salience” conditions experienced anger and bolstered their worldview

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26 Interestingly, death-related thoughts peaked at the same time as the lowest levels of complexity were achieved. Whether this paints a cognitive picture of proximal or distal defences at work is an interesting empirical question for future research.
significantly more when their cultural norms were violated. These effects were three times stronger than in a comparable mortality salience conditions. Furthermore, while subjects in the uncertainty salience condition had not been thinking about death, a significant number of those in mortality salience conditions also experienced feelings of uncertainty. This confirms earlier suggestions that the effects of mortality salience may be all the more salient when compounded with feelings of uncertainty (e.g., McGregor, Lieberman, Greenberg, Solomon, Arndt, Simon, & Pyszczynski, 1998), and implies that uncertainty is a more fundamental source of distress than is death.

During the 9/11 terrorist attacks, it is feasible that uncertainty (whether stemming from the violation of existing schemata or mortality salience) evoked distress, anxiety and anger, as well as exaggerated perceived ingroup-outgroup differences. These effects were reflected in the cognitive and emotional responses of the 9/11 newscasters. Fortunately, reliable content-analysis methods for scoring uncertainty in archival data exist (e.g., Sorrentino, Roney, & Hanna, 1992), and represent another logical follow-up to this study.

Unfortunately, the analysis of US reporters (as opposed to anchors) yielded only one reliable change score – that of Miklaszewki (NBC) following news of the crash at the Pentagon. Nevertheless, while all other North American news anchors uniformly showed increases in integrative complexity at this stage (as they presumably made efforts to integrate this new information with the events in New York), Miklaszewki showed the predicted drop in integrative complexity, supporting the fourth hypothesis. This is not difficult to understand, given that Miklaszewki was not a direct witness to the attacks in New York, would have had less information to integrate than the news anchors at that
stage, and was much more directly threatened by the attack at the Pentagon. Were there reliable data available for reporters at the WTC at this stage, no drop in integrative complexity would have been predicted. Finally, while there was only a single data point available for Dahler as he reported live from the WTC following the very first plane crash there, he was operating at a significantly lower level of complexity (with presumably a greater degree of physiological and emotional arousal) than all other newscasters at this stage.

As mentioned earlier, the effects of the upheaval on cognitive processing caused by the 9/11 terrorist attacks were expected to transcend individual differences as well as any efforts at impression management. The extent to which either of these factors significantly influenced the news anchors’ cognitive responses would have resulted in a weaker signal being present in the data. News anchors as a group, in particular, can fairly be assumed to be quite proficient at impression management. This implies that the cognitive reactions of lay people in the same situation would likely have been more severe, and renders the observed effect sizes even more impressive (Prentice & Miller, 1992).

This study represents an important step forward in several respects. This is the first time to our knowledge that integrative complexity analyses have been conducted along such a fine timeline\(^27\), or applied to transcripts of live news broadcasts. The use of

\(^27\) In a way, the methodology employed in the present study is not unlike the daily-process approach, known as ecological momentary assessment, recently popularized in the stress and coping literature (e.g., Tennen, Affleck, Armeli, & Carney,
the LIWC software program to test the predictions of terror management theory has also not been previously attempted. The success of these new methodologies opens exciting possibilities for future research.

There are also a few important caveats related to the results. One is that data for each speaker at each stage were not available, due to reasons ranging from copyright restrictions to budgetary concerns. The resulting gaps in the data rendered conventional tests of statistical significance inadequate, as important assumptions could not be satisfied. As well, given that the sample consisted of only six individuals who are not representative of the larger population, one must be cautious in drawing general conclusions from the results of this study. Finally, while the archival nature of the study ensures a high level of external validity, replicating these patterns in further case studies (such as that of the Madrid train bombings on March 11, 2004) as well as controlled laboratory studies would provide more insight into the specific causal and moderating variables at work. These may include emotional arousal, uncertainty, schema violation, degree of identification, and cognitive load.

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2000; Stone & Shiffman, 1994), in that it is an idiographic method that allows for the testing of process-oriented models of stress, coping, and adaptation.

28 While reasonably successful overall, future research employing this paradigm would benefit from augmenting the internal dictionary of LIWC with a larger set of death-related words.
Conclusion

Considerable support was found for the predictions of the cognitive manager model of integrative complexity. The stress and uncertainty arising from unexpected and severe multiple terrorist attacks were associated with both decreasing and increasing levels of integrative complexity. As well, negative emotion word-use possessed an inverse relationship with integrative complexity, consistent with the disruptive stress hypothesis. Newscasters from the United States and Canada demonstrated virtually identical patterns of complexity, and reporters at the site of the attacks showed stronger effects of disruptive stress than news anchors. Finally, support was found for the predictions of terror management theory. The use of death-related words was strongly associated with linguistic indicators of anxiety and anger, with this relationship growing weaker with increasing psychological or ideological distance. Future research will test potential moderators of these relationships using convergent methodology.
References


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