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## Individual differences in the interpretation of ambiguous statements about time

**Abstract:** What factors influence the ways in which people resolve ambiguity? In English, two contrasting perspectives are implicit in deictic temporal expressions: the Moving Time metaphor conceptualizes time as moving forward towards the ego and the Moving Ego metaphor conceptualizes the ego as moving forward towards the future (Clark 1973). We examine the ambiguity arising from these two conceptualizations, claimed to be equally likely in a “neutral” context (Boroditsky and Ramscar 2002). Whereas previous studies have demonstrated that exposure to a spatial situation related to one interpretation may influence the resolution of the ambiguity (e.g. Boroditsky 2000; Núñez 2007), we focus on the lifestyle and personality factors of the participants as potential additional influences on ambiguity resolution in the interpretation of temporal metaphors. Experiment 1 asks whether lifestyle might influence an individual’s approach to time and resulting resolution of temporal ambiguity, comparing preferred responses from two groups of participants with very different demands on the structuring of time: university students and administrators. We observed a difference between the two groups, with administrators more frequently adopting the Moving Time perspective and students, the Moving Ego perspective. Experiment 2 examines personality-related differences, focusing specifically on individual differences in procrastination (Lay 1986) and conscientiousness (John 1990). We observed a significant effect with participants who adopted the Moving Ego perspective reporting higher procrastination scores and lower conscientiousness scores than participants who adopted the Moving Time perspective. Experiment 3 investigates further personality-related differences, focusing specifically on individual differences in extroversion (John 1990). We observed a relationship between extroversion and disambiguation responses, with participants who adopted the Moving Ego perspective evidencing higher levels of extroversion. Taken together, the results from these three studies suggest that individual differences in lifestyle and personality may influence people’s perspectives on the movement of events in time and their concomitant interpretation of temporally ambiguous utterances, precluding a universal “neutral” context within which language is interpreted.

**Keywords:** Moving Time, Moving Ego, metaphor, temporal perspective, ambiguity, individual differences, lifestyle, personality.

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## 1 Introduction

It has long been observed that speakers systematically employ language from concrete and perceptually rich domains to talk about abstract concepts. One of the most paradigm examples of this is illustrated by the ways in which the abstract domain TIME is metaphorically conceptualized in terms of the concrete domain SPACE in a wide range of languages throughout the world (e.g. Evans 2004; Haspelmath 1997; Núñez and Sweetser 2006; Yu 1998). In English, there are various types of spatial metaphors for time, including those structured around the relative placement of ego and events in time (Moving Ego and Moving Time, Clark 1973; Lakoff and Johnson 1999), those structured around the conceptualization of events as elements in a sequence (Moore 2006; Núñez et al. 2006), and those structured around the conceptualization of events placed in relation to the forward-moving flow of time, without additional reference points (Kranjec 2006). Of these, the space-time metaphors that have received the most attention in the empirical literature are those structured around the relative placement of ego and events in time (e.g. Boroditsky and Ramscar 2002; Matlock et al. 2005; McGlone and Harding 1998; Ramscar et al. 2010). In the Moving Ego metaphor, time is depicted as a stationary landscape that the active ego moves across, as evidenced by expressions such as *We're approaching Christmas* and *We're coming up to the deadline*. In the Moving Time metaphor, time is conceived as a conveyor belt that events move along, from the future to the past, relative to a stationary ego, as evidenced by expressions such as *Christmas is approaching* and *The deadline is coming up*. These two metaphors are argued to be equally common in English speakers' conceptualizations of time: "In a neutral context, people are equally likely to think of themselves as moving through time as they are to think of time as coming toward them" (Boroditsky and Ramscar 2002: 185).<sup>1</sup>

The systematicity and coherence of the Moving Ego and Moving Time metaphors in language have given rise to research investigating the psychological reality of these two metaphors. In a seminal study conducted by McGlone and Harding (1998), participants were asked to interpret a series of context sen-

tences which were phrased in either the terms of the Moving Ego metaphor (e.g. *we passed the deadline two days ago*) or the Moving Time metaphor (e.g. *the deadline passed two days ago*). At the end of the block of priming statements, participants read an ambiguous target statement, such as *The meeting originally scheduled for next Wednesday has been moved forward two days* and were then asked to indicate the day of the week on which the event would occur. The results showed that participants tended to disambiguate the target consistently with the primes, such that participants who were primed with Moving Ego metaphors more frequently interpreted “moved forward” in line with the Moving Ego perspective (responding *Friday*), and participants who were primed with Moving Time metaphors more frequently interpreted “moved forward” in line with the Moving Time perspective (responding *Monday*). In addition to providing evidence for two psychologically distinct global systems underlying two different ways of mapping events in time, these results suggest that the perspective adopted in the interpretations of unambiguous temporal statements may exert an influence on the interpretation of subsequent ambiguous temporal statements.

Building on McGlone and Harding’s (1998) findings, Boroditsky (2000) and Boroditsky and Ramscar (2002) devised a series of experiments to investigate whether engaging in certain types of spatial thinking might influence how people think about time. In one experiment, participants were asked to imagine moving towards a stationary object or to imagine an object moving towards them before

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<sup>1</sup> Although spatial metaphors for time are attested in English, one area that has received comparatively less attention is how common natural usages of these metaphors are and how they are used. One reviewer raises the question of whether space-time metaphors are in fact quite infrequent and used only in circumscribed contexts. To illustrate, two of the most cited VPs used in examples of Moving Ego and Moving Time metaphors are *approaching* and *coming up* (Clark 1973; Bender et al. 2010; Boroditsky 2000; Evans and Green 2006; Lakoff and Johnson 1999; McGlone and Harding 1998; Moore 2006; Núñez 2007; Núñez and Sweetser 2006; Radden 2004). In order to assess the frequency of temporal uses of these VPs in natural production, we extracted 200-token samples for each VP from the *Brigham Young University-British National Corpus* (BYU-BNC; Davies 2004–). Of these, we identified 20 temporal instances of *approaching* and 17 temporal instances of *coming up* (see Appendix); thus, demonstrating that although space-time metaphors may be infrequent, they are attested in corpora. Examination of the extracted instances revealed that 60% of the instances of *approaching* and 53% of the instances of *coming up* represented the Moving Time perspective. While an extensive analysis of the nature and frequencies of naturally occurring temporal expressions is beyond the remit of this paper, it is nevertheless worth highlighting their rate of occurrence in natural language use.

answering the ambiguous *Next Wednesday's meeting* question. Based on the assumption that our experience of time is grounded in our understanding of space (Lakoff 1993; Lakoff and Johnson 1980, 1999), it was hypothesized that imagining moving through space towards a stationary object is analogous to the Moving Ego perspective and imagining a moving object travelling through space towards the self is analogous to the Moving Time perspective. Thus, if space and time do share some relational structure, participants primed in the ego-moving spatial condition should “reuse” this perspective for time and answer *Friday*, whereas participants primed in the object-moving spatial condition should adopt the Moving Time perspective and answer *Monday*. As predicted, participants tended to respond in a prime-consistent manner to the *Next Wednesday's meeting* question, suggesting that different ways of thinking about motion in space can yield different construals of time. Further experiments conducted in a range of settings have confirmed these initial findings (Boroditsky and Ramscar 2002). For instance, participants who were at the beginning or end of a train journey and thus more likely to be engaged with the notion of travelling were more likely to respond *Friday* than participants who were in the middle of their journey. This pattern of results suggests that the temporal perspective adopted, and hence the interpretations of ambiguous temporal statements, can be primed not only by temporal, but also by spatial stimuli; thus, indicating that spatial and temporal representations are conceptually related.

These preliminary results have been extended, with demonstrations that non-deictic spatial schemas (Kranjec 2006; Núñez et al. 2006), abstract spatial motion schemas (Matlock et al. 2011) and deictically-oriented fictive motion schemas (Matlock et al. 2005; Ramscar et al. 2010) can also influence interpretations of ambiguous temporal statements. For example, Matlock et al. (2005) and Ramscar et al. (2010) conducted a number of experiments to investigate whether thinking about fictive motion (FM), similarly to thinking about actual motion, would influence the ways in which people think about time. In these studies, participants were primed with one of two FM sentences, *The road goes all the way to New York* or *The road comes all the way from New York* (whereby the participants' location at Stanford was the implied starting point or end point) before answering the *Next Wednesday's meeting* question. The results showed that when participants were primed with FM going away from them, from Stanford to New York, they were more likely to provide a *Friday* response, whereas when participants were primed with FM coming towards them, from New York to Stanford, they were more likely to provide a *Monday* response. As was the case with actual motion, Ramscar et al. (2010) concluded that just thinking about fictive motion is sufficient to influence how people think about time. Furthermore, these findings further substantiate the claim that when people engage in certain kinds of

spatial-motion thinking, they may also unwittingly and dramatically change how they think about time.

While spatial schemas may exert an important influence on the structure and representation of time, a closer look at responses in the absence of priming reveals an additional potential contributor: only student participants have been sampled in a “neutral” context, and these respondents have shown a preference for answering *Friday*: Boroditsky (2000), Núñez (2007) and Sullivan and Barth (2012) report these figures to be 54%, 61% and 77%,<sup>2</sup> respectively. To further put these numbers in perspective, Boroditsky and Ramscar (2002, Study 1) report that people primed to imagine themselves moving through space (and predicted to adopt the Moving Ego perspective) responded *Friday* 57% of the time. Similarly, people waiting to fly (and thus likely thinking about motion and predicted to adopt the Moving Ego perspective) responded *Friday* 62% of the time (Boroditsky and Ramscar 2002, Study 3). Thus, rates of *Friday* responses which differ little from the “neutral” context baselines have been taken as evidence for the adoption of the Moving Ego perspective, suggesting that there might be something about the population sampled that favours one direction in the resolution of temporal ambiguity.

As researchers in the cognitive sciences have been concerned primarily with testing the effects of priming on the interpretation of ambiguous temporal statements, preferred temporal perspective in a “neutral” unprimed context has received scant attention. However, recent research investigating the ways in which people perceive and understand time has extended beyond demonstrating the psychological reality of space-time metaphors and has begun to consider language-external characteristics of the participants on the perception of time and the resolution of temporally ambiguous utterances. In an innovative study, Hauser et al. (2009) investigated the link between the seemingly unrelated but similarly embodied abstract domains of anger and time. Anger, both as an event-induced emotion and as a personality trait, is spatially represented by approach-related motivations, which cause the active self to approach a goal or situation (Harmon-Jones 2007), much as the self moves into the future in the Moving Ego metaphor. Building on aspects of Conceptual Metaphor Theory; namely, that people understand abstract concepts, such as anger or time, in terms of more concrete domains, such as space, and that multiple abstract concepts can borrow from the same source domain, Hauser et al. (2009) hypothesized that anger and

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<sup>2</sup> Sullivan and Barth’s (2012) sample consisted of a mostly (~98%) student population (Hilary Barth, personal communication, August 2013).

the Moving Ego representation of time may tap into a similar approach-related spatial motivation that would serve as an embodied cognitive link between the two domains. To test this hypothesis, Hauser et al. (2009) asked participants to complete questionnaires designed to measure trait anger (that is, anger as part of their personality) before responding to the *Next Wednesday's meeting* question. Their findings showed that participants with higher trait anger, as measured by the questionnaires, were more likely to adopt the Moving Ego perspective (responding *Friday*) than to adopt the Moving Time perspective (responding *Monday*). In discussing the implications of their results, Hauser et al. (2009: 1178) observe that as time representation is influenced by trait anger, it raises the possibility that additional personality-related differences may play important roles in influencing how people reason about time.

More recently, Richmond et al. (2012), reasoning that those with a strong sense of personal agency (Vallacher and Wegner 1989) would be more likely to conceive of themselves as moving through time, investigated the relationship between level of perceived personal agency and temporal perspective. In one experiment, participants responded to the *Next Wednesday's meeting* question before completing a questionnaire for measuring individual differences in the level of perceived personal agency (Richmond et al. 2012, Study 2). The findings showed that, in line with their predictions, participants who adopted the Moving Ego perspective reported significantly higher agency scores in comparison to participants who adopted the Moving Time perspective; thus providing initial evidence for the relationship between perceived agency and temporal perspective. Probing this relationship further, Richmond et al. (2012, Study 3) examined whether perceived agency and temporal perspective might be associated with emotional experiences. Reasoning that people who feel in control and proactively approach a positive future are more likely to experience feelings of happiness, while people who wait for time to exert control over them are more likely to experience depression, Richmond et al. (2012) hypothesized that higher levels of self-reported happiness would encourage the adoption of the Moving Ego perspective (indicated by a *Friday* response), while higher levels of self-reported anxiety and depression would encourage the adoption of the Moving Time perspective (indicated by a *Monday* response). To test this, they compared participants' responses to the *Next Wednesday's meeting* question with their scores on a series of questionnaires for measuring anxiety, happiness and depression. In line with their predictions, the results showed that participants who adopted the Moving Ego perspective evidenced higher scores for happiness than participants who adopted the Moving Time perspective. Conversely, participants who adopted the Moving Time perspective evidenced higher scores for anxiety and depression than participants who adopted the Moving Ego perspective. Taken together, these

findings extend the range of individual differences that may influence people's representations of time.

While the majority of research investigating abstract thinking about time has thus far been primarily focused on investigating spatial influences on temporal reasoning, arguably, there are factors beyond the control of the experimenters that play a role in how speakers interpret an ambiguous temporal utterance – suggesting an important gap in our understanding of the contributors to language understanding. In particular, recent lines of research have provided initial evidence that personality differences and emotional experiences may also influence people's perspectives on the movement of events in time and their concomitant interpretations of temporally ambiguous utterances, precluding a universal “neutral” context within which language is interpreted (Hauser et al. 2009; Richmond et al. 2012; see also Margolies and Crawford 2008; Ruscher 2011). Furthermore, while motion in space is demonstrably related to temporal perspective (e.g. Boroditsky 2000; Boroditsky and Ramscar 2002), it cannot be the sole determiner: Margolies and Crawford (2008) found different effects of emotional valence on responses to the *Next Wednesday's meeting* question when compared to responses to a question asking whether participants considered themselves to be approaching an event or considered the event to be approaching them. Thus, rather than being attributed to a single factor, a person's conceptualization of time likely results from a culmination of factors. To reiterate Richmond et al. (2012), although time is objectively measured, it is subjectively understood. Taken together, these findings give rise to the question: which other individual differences might influence how people think about time? To address this question, three experiments were conducted, investigating whether previously unexplored lifestyle and personality differences may influence a person's conceptualization of time and their concomitant interpretation of an ambiguous temporal expression. First, because the majority of studies have sampled student populations, but the lifestyle of a student is not representative of the general population, we investigated whether lifestyle might influence an individual's approach to time, comparing the preferred responses of university students to the *Next Wednesday's meeting* question with those from a sector of the population operating under quite different time pressures: university administrators (Experiment 1). Turning to factors more tightly bound to the individual, we investigated whether individual differences in procrastination, conscientiousness (Experiment 2) and extroversion (Experiment 3) might influence the temporal perspective adopted in response to the *Next Wednesday's meeting* question. The results of the experiments provide further evidence that individual differences in lifestyle and personality may combine with context to influence the ways in which comprehenders resolve linguistic ambiguities regarding the placement of events in time.

## 2 The present studies

### 2.1 Lifestyle differences: Students and administrators

As discussed, earlier lines of research investigating the psychological reality of space-time metaphors have focused on testing the effects of priming on the interpretation of ambiguous temporal statements primarily among students (Boroditsky 2000; Núñez 2007; see also Alloway et al. 2006; Matlock et al. 2005; Matlock et al. 2011; Núñez et al. 2006; Ramscar et al. 2010). More to the point, only students have been surveyed outside of a priming context. However, as observed by Hauser et al. (2009: 1178):

... time representation is not simply affected by situations (e.g. one's current movement through space), but is a variable that is influenced by perceptually related individual differences.

Thus, one issue that warrants further investigation is that the lifestyle of a student is not representative of the general population, which gives rise to the possibility that earlier results may have occurred, in part, due to the particular lifestyle typical of the participant population. To illustrate, in UK universities, the average academic year is 24 weeks and students receive an average of 13.4 contact hours per week (NUS-HSBC 2011; Guardian 2011); thus, students are able to structure the bulk of their time for themselves. By contrast, UK administrators, managers and professionals (representing 65.2% of the UK labour market) and UK full-time employees work on average 41.4 hours per week and receive 28 days annual paid leave (BBC News 2008; Directgov 2012; Office for National Statistics 2010). For these full-time employees, time is primarily structured by external demands rather than by the employees themselves. Furthermore, whereas workers are paid for their time, students are the ones who pay to attend university; they are the consumers. Therefore, generally speaking, whereas students have the option of turning up to a lecture, workers do not have the option of turning up for work, providing students with a greater degree of temporal flexibility in their daily lives than that enjoyed by workers in full-time positions. As such, students differ from full-time employees in two separate but related ways: first, students are relatively in control of the structuring of their time, whereas employees are relatively controlled by time; second, students enjoy a relatively high degree of temporal flexibility. In view of these differences, and in view of insights from Richmond et al. (2012), who found that people who report higher levels of perceived personal agency were more likely to adopt the Moving Ego perspective, we hypothesized that these differences may influence people's attitudes about time, with the result

that people who have control over time and temporal flexibility in their daily lives, such as students, may think of time quite differently to those who require high degrees of time management on a daily basis and are regimented by the clock, such as administrators.

To this end, in Experiment 1, we ask whether the nature of a person's lifestyle contributes to their view of time and, hence, to their interpretation of ambiguous statements about time in an unprimed context. To test this, we presented university students and administrators (such as personal assistants, secretaries, university timetable coordinators), who deal with the daily management of a multitude of events and activities, with the ambiguous *Next Wednesday's meeting* question. With their relative control over the structuring of their own time and high degree of temporal flexibility, we predict that students will be more likely to adopt the Moving Ego perspective, showing a preference for interpretations in which the meeting has been moved later in time, to *Friday*, as observed in previous studies. In contrast, professionals are subject to more external constraints and hence are more aware of external influences and pressures. As such, we predict that administrators, who require high degrees of time management in their daily lives and for whom time is relatively controlled by external demands, will be more likely to adopt the Moving Time perspective, showing a preference for interpretations in which the meeting has been moved earlier in time, to *Monday*.

## 2.2 Experiment 1

### 2.2.1 Participants

123 adults from Northumbria University participated in this experiment. 90 participants were administrators, with an age range of 23 to 62 years and a mean age of 40 years. 33 participants were full-time students (undergraduate and postgraduate), with an age range of 19 to 61 years and a mean age of 30 years. All participants were native speakers of English from the UK.

### 2.2.2 Materials and procedure

Participants were approached on the Northumbria University campus in offices, coffee shops and the university library. Following informed consent, all participants completed a questionnaire using a pen while sitting down. The questionnaire consisted of one experimental question: the *Next Wednesday's meeting* disambiguation paradigm, in addition to demographic questions requesting the

participant's age, gender, native language, nationality and occupation. Participants were informed that the experimenter was investigating attitudes towards time management in universities.

The following instructions appeared at the top of the page:

Please read the following question and provide your answer below. Do not spend too much time thinking about it and do not change your answer: I am interested in your initial reaction.

*Next Wednesday's meeting has been moved forward two days.  
What day has the meeting been re-scheduled to?*

### 2.2.3 Results and discussion

As predicted, we found that administrators were more likely to respond *Monday*, while students were more likely to respond *Friday*. Concretely, only 28.9% of administrators responded *Friday* in comparison to 60.6% of students. To determine whether the difference in responses between administrators and students was significant, a chi-square test for independence was used. The chi-square test revealed a significant relationship:  $\chi^2_{1,123} = 10.375$ ;  $p < 0.001$ ; Cramer's  $V = 0.290$ .<sup>3</sup> Indeed, the student response is in line with the responses of control group participants in the studies conducted by Boroditsky (2000), Núñez (2007) and Sullivan and Barth (2012), who report a similar preference among students for answering *Friday* in an unprimed context. Moreover, the effect size is also comparable with that of Núñez (2007): Cramer's  $V = 0.239$ .<sup>4</sup> In contrast, the administrators demonstrated a tendency to choose *Monday*, in line with predictions based on lifestyle differences between the two groups.

These results indicate an influence of lifestyle on people's preferred temporal perspective and consequent responses to a temporally ambiguous question: as predicted, students, with their high degree of temporal flexibility and relative

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<sup>3</sup> For completeness, we also examined results for an age-matched sub-group of students and administrators ( $N = 30$ ;  $R = 23$  to 57 years;  $M = 37$  years;  $SD = 13.100$ ). In line with the overall findings, 26.7% of administrators responded *Friday* in comparison to 66.7% of students. To determine whether the difference in responses between administrators and students was significant, a chi-square test for independence was used. The chi-square test revealed a significant relationship:  $\chi^2_{1,30} = 4.821$ ;  $p = 0.028$ ; Cramer's  $V = 0.401$ .

<sup>4</sup> Due to insufficient information, we were unable to calculate the effect size for Boroditsky (2000) and Sullivan and Barth (2012).

control over the structuring of their own time, were more likely to think in a more egocentric way, and thus, were more likely to adopt the Moving Ego perspective (responding *Friday*). In contrast, professionals, who are subject to more external constraints and are more aware of external influences and pressures, were more likely to adopt the Moving Time perspective (responding *Monday*). Experiment 1 thus provides initial evidence that lifestyle differences may influence people's perspectives on the movement of events in time and their concomitant interpretations of temporally ambiguous utterances.

Hand-in-hand with lifestyle differences, there is a tendency for students and administrators to differ along certain personality parameters. For example, research shows that procrastination is especially common in the academic domain, with up to 95% of students procrastinating habitually with academic tasks such as writing assignments, studying for examinations and keeping up-to-date with weekly seminar reading (Ellis and Knaus 1977; Ferrari and Beck 1998; see also Solomon and Rothblum 1984). Furthermore, Rivera (2007) claims that procrastination is likely to be the single most common time management problem and that students rank highly as a group most vulnerable to procrastination. In contrast to the student population, procrastination has been found to chronically affect 15–20% of nonstudent adults, with the lowest rates of procrastination reported by professional, business and educational employees, such as university administrators (Harriott and Ferrari 1996). Consistent with this assumption, the essential job criteria for Northumbria University administrators, like those in our study, stipulate that applicants should possess “Excellent organisational skills” and the “Ability to prioritise workload and manage conflicting priorities” (Work4Northumbria 2012). If the preferences observed in Experiment 1 were driven, in part, by a tendency for students to procrastinate and for administrators to resist procrastination, we might expect that people who report high degrees of procrastination would be more likely to adopt the Moving Ego perspective than people who report low degrees of procrastination. To test this, Experiment 2 directly examines the relationship between temporal perspective and procrastination.

### 2.3 Personality differences: Procrastination

In Experiment 1, we found that a population which tends to be associated with high rates of procrastination tended to adopt the Moving Ego perspective in their responses to the *Next Wednesday's meeting* question, while a population which tends to be associated with low rates of procrastination tended to adopt the Moving Time perspective. How might the tendency to procrastinate relate to the

interpretation of a temporally ambiguous utterance? As defined by the Oxford English Dictionary (OED 2007), to *procrastinate* is:

To defer action, delay; to postpone until another day; to defer; to put off; to be dilatory.

Consistent with this, evidence from personality research suggests that procrastinators are characterized by a tendency to defer or postpone action (Milgram et al. 1998; Milgram and Tenne 2000), whereas conscientious individuals tend to prioritize action (Back et al. 2006; John and Srivastava 1999). Looked at another way, the deferment associated with procrastination can be understood as the movement of tasks ‘forward’ into the future, in a direction defined by the ego’s movement through time (in line with the Moving Ego perspective), while the prioritization associated with conscientiousness can be viewed as the movement of tasks ‘forward’ towards the present, *ergo* towards the ego (in line with the Moving Time perspective). Thus, if this habitual movement of tasks helps to define the temporal perspective adopted in response to the *Next Wednesday’s meeting* question, we should see that procrastinators favour the Moving Ego perspective, and conscientious individuals, the Moving Time perspective.

Along with the opposed directionality of task movement, personality research also indicates that lack of conscientiousness may account for task avoidance procrastination and dilatory behaviour (Milgram and Tenne 2000; Schouwenburg and Lay 1995). This negative correlation suggests a means by which to strengthen our test of the relation between procrastination and time perspective: because procrastination operates in parallel to (lack of) conscientiousness in predicting behaviour, the relation found between procrastination and dilatory behaviour should be matched by an inverse relation between conscientiousness and dilatory behaviour (cf. Johnson and Bloom 1995; Lay 1997; Schouwenburg and Lay 1995).

In Experiment 2 we draw upon this connection to further examine the role that individual differences play in influencing people’s preferred temporal perspective. Specifically, Experiment 2 investigates whether individual differences in conscientiousness (John 1990) and procrastination (Lay 1986) contribute to a person’s view of time and, hence, to their interpretation of the ambiguous *Next Wednesday’s meeting* question in an unprimed context. Consistent with the correlations between procrastination and lifestyle and with the results of Experiment 1, we predict that people who adopt the Moving Ego perspective (responding *Friday*) will exhibit a higher degree of procrastination, as well as a lower degree of conscientiousness, whereas people who adopt the Moving Time perspective (responding *Monday*) will exhibit a lower degree of procrastination, as well as a higher degree of conscientiousness.

## 2.4 Experiment 2

### 2.4.1 Participants

28 full-time undergraduate students from Northumbria University participated in this experiment, with an age range of 18 to 27 years and a mean age of 20 years. 8 participants were male and 20 were female. All participants were native speakers of English from the UK.

### 2.4.2 Materials and procedure

A three-part questionnaire was distributed to a first year introductory English literature class. Following informed consent, all participants completed the questionnaire using a pen while sitting down.

Part 1 of the questionnaire gathered demographic information: age, gender, native language and nationality.

For Part 2 of the questionnaire, procrastination was measured using the Student Procrastination Scale (Lay 1986) and conscientiousness was measured using the Big Five Inventory (BFI; John 1990). Sample items included: *I generally delay before starting on work I have to do* (procrastination) and *I see myself as someone who does things efficiently* (conscientiousness). A five-point Likert scale was used with “Very true” anchoring the left-hand side of the scale, “Neutral” in the middle and “Very untrue” anchoring the right-hand side of the scale.

The final part of the questionnaire consisted of one question: the *Next Wednesday’s meeting* disambiguation paradigm. Participants read the following instructions:

Please read the following question and provide your answer below. Do not spend too much time thinking about it and do not change your answer: I am interested in your initial reaction.

*Next Wednesday’s meeting has been moved forward two days.  
What day has the meeting been re-scheduled to?*

### 2.4.3 Results and discussion

The Student Procrastination Scale Key (Lay 1986) was used to calculate the average procrastination score for each participant. The scale ranged from 1–5, with 1 denoting a low procrastination score and 5 denoting a high procrastination score. Mean scores for each individual were calculated by adding the scores for each statement and dividing by the total number of statements, i.e. 20. As

predicted, participants who adopted the Moving Ego perspective (responding *Friday*) averaged significantly higher procrastination scores ( $M = 3.541$ ;  $SD = 0.337$ ) than participants who adopted the Moving Time perspective (responding *Monday*) ( $M = 2.978$ ;  $SD = 0.499$ ),  $t(26) = 3.446$ ,  $p = 0.002$ ,  $d = 1.322$ .

The BFI Scoring Key (John and Srivastava 1999) was then used to calculate the average conscientiousness score for each participant. The scale ranged from 1–5, with 1 denoting a low conscientiousness score and 5 denoting a high conscientiousness score. Mean scores for each individual were calculated by adding the scores for each statement and dividing by the total number of statements, i.e. 9. Again, as predicted, participants who adopted the Moving Time perspective (responding *Monday*) averaged significantly higher conscientiousness scores ( $M = 3.695$ ;  $SD = 0.552$ ) than participants who adopted the Moving Ego perspective (responding *Friday*) ( $M = 3.153$ ;  $SD = 0.697$ ),  $t(26) = 2.299$ ,  $p = 0.030$ ,  $d = 0.862$ .

Furthermore, in concordance with earlier studies which demonstrate that procrastination operates in parallel to (lack of) conscientiousness in predicting behaviour (Johnson and Bloom 1995; Lay 1997; Schouwenburg and Lay 1995), we found that there was a significant negative correlation between conscientiousness and procrastination (Spearman's  $\rho = 0.801$ ,  $p < 0.0001$ ).

Building on earlier findings regarding the interplay between personality factors and temporal disambiguation (Hauser et al. 2009; Richmond et al. 2012), Experiment 2 provides converging evidence that personality differences play a role in influencing how people think about time and interpret temporally ambiguous language. Specifically, as predicted, participants who interpreted the temporally ambiguous *Next Wednesday's meeting* question in line with the Moving Ego perspective (answering *Friday*) averaged higher degrees of procrastination and lower degrees of conscientiousness as compared to participants who adopted the Moving Time perspective (answering *Monday*). Whereas Experiment 2 examined a personality factor connected to the lifestyle difference examined in Experiment 1, the earlier studies suggest that additional individual factors which share a conceptual relation with the Moving Ego and Moving Time metaphors may likewise influence the resolution of temporally ambiguous language (cf. Hauser et al. 2009; Richmond et al. 2012). Thus, to further investigate the role that personality differences play in influencing how people think about time, Experiment 3 examines the relationship between temporal perspective and another Big Five personality factor: extroversion.

## 2.5 Personality differences: Extroversion

One of the most reliably identified personality differences is the distinction between extroverts and introverts (Eysenck 1952; Giambra et al. 1988; Revelle et al.

1980). Extroverts are typically characterized as assertive, dominant, and energetic, implying a more active approach towards the social and material world, whereas introverts are better characterized as withdrawn, reserved, and compliant, implying a more passive approach (John 1990; John and Srivastava 1999; John et al. 2008). Furthermore, extroversion is represented by behavioural approach motivations (e.g. Elliot and Thrash 2002), much like anger, which Hauser et al. (2009) found to be associated with *Friday* responses to the *Next Wednesday's meeting* question. Approach and avoidance motivations are inherently spatial (cf. Hauser et al. 2009; Margolies and Crawford 2008); thus, building on earlier lines of research which demonstrate that engaging in particular types of spatial thinking can yield different construals of time, we hypothesized that there would be differences in temporal reasoning between extroverts and introverts that parallel the spatially-based differences between approach and avoidance. Because approach motivation involves the activation of outward, goal-directed and engaging behaviours (Higgins 1997), extroversion aligns well with the Moving Ego perspective, with its connections to active control over the structuring of one's own time. By contrast, avoidance motivation involves passive or inhibited behaviours (Higgins 1997); thus, introversion aligns well with the Moving Time perspective, with its suggestion that it is time that exerts control over the passive individual.

To this end, the aim of Experiment 3 is to further examine the role that spatially grounded individual differences play in influencing people's preferred temporal perspective. Specifically, Experiment 3 investigates whether individual differences in extroversion (John 1990) contribute to a person's view of time and, hence, to their interpretation of the ambiguous *Next Wednesday's meeting* question in an unprimed context. We predict that the more active, assertive personalities of extroverts would lead to a higher likelihood of adopting the Moving Ego perspective (responding *Friday*) and the more passive personalities of introverts would lead to a higher likelihood of adopting the Moving Time perspective (responding *Monday*).

## 2.6 Experiment 3

### 2.6.1 Participants

46 adults with an age range of 18 to 73 years and a mean age of 42 years participated in this experiment. 14 participants were male and 32 were female. In order to more clearly focus on the distinction between extroverts and introverts, we chose to sample a broad cross-section of society: occupations ranged from

unemployed to professional (academics, lawyers) and highest level of qualification ranged from no qualifications to PhD level. All participants were native speakers of English from the UK.

### 2.6.2 Materials and procedure

Participants were approached in libraries, coffee shops, sports centres and social clubs in Newcastle-upon-Tyne. Following informed consent, all participants completed a four-part questionnaire using a pen while sitting down.

Part 1 of the questionnaire gathered demographic information: age, gender, native language, nationality and highest level of education.

For Part 2 of the questionnaire, participants completed an acceptability judgment task which consisted of 9 pairs of temporal expressions, such as *We're approaching Christmas* (Moving Ego) and *Christmas is approaching* (Moving Time). Participants were presented with a 5-point Likert scale for each pair of expressions, with each expression anchoring one end of the scale and "equally good" anchoring the centre. The purpose of including this task was to ensure that in unambiguous temporal expressions, both the syntactic framing associated with the Moving Ego perspective and that associated with the Moving Time perspective were acceptable to our participant population.

For Part 3 of the questionnaire, extroversion was measured using the eight extroversion statements, such as *I see myself as someone who is reserved*, from the BFI (John 1990) and a five-point Likert scale with "Very true" anchoring the left-hand side of the scale, "Neutral" in the middle and "Very untrue" anchoring the right-hand side of the scale.

The final part of the questionnaire consisted of one question: the *Next Wednesday's meeting* disambiguation paradigm. Participants read the following instructions:

Please read the following question and provide your answer below. Do not spend too much time thinking about it and do not change your answer: I am interested in your initial reaction.

*Next Wednesday's meeting has been moved forward two days.  
What day has the meeting been re-scheduled to?*

### 2.6.3 Results and discussion

The BFI Scoring Key (John and Srivastava 1999) was used to calculate the average extroversion score for each participant. The scale ranged from 1–5, with 1 denot-

ing a low extroversion score and 5 denoting a high extroversion score. Mean extroversion scores for each individual were calculated by adding the scores for each statement and dividing by the total number of statements, i.e. 8. As predicted, participants who adopted the Moving Ego perspective (responding *Friday*) averaged significantly higher extroversion scores ( $M = 3.739$ ;  $SD = 0.554$ ) than participants who adopted the Moving Time perspective (responding *Monday*) ( $M = 3.353$ ;  $SD = 0.721$ ),  $t(44) = 2.036$ ,  $p = 0.048$ ,  $d = 0.600$ .

We then examined participants' preferences for either the syntactic framing associated with the Moving Ego perspective or that associated with the Moving Time perspective in the absence of ambiguity. We assigned numerical values to the Likert scales used in the acceptability judgment task, with  $-2$  corresponding to the Moving Time end of the scale,  $0$  corresponding to the centre of the scale (i.e. both statements equally good), and  $2$  corresponding to the Moving Ego end of the scale. Our results showed no preference for either perspective in unambiguous statements ( $M = -0.056$ ,  $SD = 0.601$ ).

Experiment 3 thus provides converging evidence that individual differences in personality play a role in influencing how people think about time. Specifically, as predicted, participants who interpreted the temporally ambiguous *Next Wednesday's meeting* question in line with the Moving Ego perspective (answering *Friday*) averaged higher degrees of extroversion than participants who disambiguated the question in line with the Moving Time perspective (answering *Monday*).

### 3 General discussion

Hitherto, the vast majority of research investigating abstract thinking about time has been primarily focused on investigating spatial influences on temporal reasoning; however, recent lines of research have extended beyond this, providing initial evidence that emotional experiences and, to a lesser extent, personality differences, may also influence people's perspectives on the movement of events in time and their concomitant interpretations of temporally ambiguous utterances, suggesting that there may not be a universal "neutral" context within which language is interpreted (Hauser et al. 2009; Richmond et al. 2012; see also Margolies and Crawford 2008; Ruscher 2011). As people's conceptualizations of time cannot be attributed to a single factor, but instead, to a complex of factors, we sought to further investigate which other individual differences might influence the ways in which people reason about events in time. Our results demonstrate that both lifestyle and personality factors influence people's temporal perspective, precluding a universal "neutral" context for language interpretation and ambiguity resolution.

In Experiment 1, we addressed the representativeness of the undergraduate populations directly, asking whether lifestyle differences play a role in influencing people's preferred temporal perspective. To do this, we compared responses of students to the *Next Wednesday's meeting* question with those of administrators. We found that students, with relative control over the structuring of their own time and a high degree of temporal flexibility, were more likely to adopt the Moving Ego perspective (responding *Friday*). In contrast, administrators, who deal with the daily management of events and for whom time is regulated by external demands, were more likely to adopt a Moving Time perspective (responding *Monday*). Thus, lifestyle factors may carry through to language interpretation, leading to differences in the interpretation of an ambiguous temporal utterance in the absence of further disambiguation cues.

Building on earlier findings, which demonstrate that personality differences play a role in influencing how people think about time (Hauser et al. 2009; Richmond et al. 2012), Experiment 2 investigated whether individual differences in conscientiousness (John 1990) and procrastination (Lay 1986) contribute to a person's view of time and, hence, to their interpretation of the ambiguous *Next Wednesday's meeting* question in an unprimed context. In line with the prediction that the habitual movement of tasks may be a contributor to the temporal perspective adopted in response to McGlone and Harding's (1998) ambiguous meeting question, with procrastinators tending to postpone action to a later date (Milgram et al. 1998; Milgram and Tenne 2000), and conscientious individuals tending to prioritize early action (Back et al. 2006; John and Srivastava 1999), we found that participants who adopted the Moving Ego perspective (answering *Friday*) averaged higher degrees of procrastination, as well as lower degrees of conscientiousness, whereas participants who adopted the Moving Time perspective (answering *Monday*) averaged higher degrees of conscientiousness, as well as lower degrees of procrastination.

Experiment 3 provided converging evidence that individual differences in personality play a role in influencing how people think about time. Our findings in this experiment focused on one personality factor – extroversion – a factor that is characterized by an active approach-related motivation (John and Srivastava 1999). In line with this active approach to events, we observed that participants who adopted the Moving Ego perspective (responding *Friday*) reported a higher degree of extroversion than participants who adopted the Moving Time perspective (responding *Monday*). Taken together, the findings from Experiments 2 and 3 re-emphasize the differences noted in Experiment 1, while suggesting a potential convergence between the roles of lifestyle and personality in the resolution of temporal ambiguity. This convergence of factors is incompatible with the assumption of a “neutral” context, suggesting that language interpretation may

arise from an interaction between that which is encoded in the utterance and aspects of the experiences and personality of the interpreter.

Our finding that the lifestyle and personality of the comprehender influences the interpretation of an ambiguous temporal utterance raises the question of whether other kinds of factors may exert significant influences on interpretation. Previous research on the *Next Wednesday's meeting* question points to two aspects of what is encoded in the question that may interact with the lifestyle and personality factors examined here.

First, the ambiguous question asks about the rescheduling of a “meeting”, the nature of which is unspecified to the comprehender.<sup>5</sup> Recent research has demonstrated that the valence of an event (positive or negative) may influence how people reason about time (Margolies and Crawford 2008). Reasoning that positive affect is typically associated with approach motivations and negative affect, with avoidance motivations (Cacioppo et al. 1993; Chen and Bargh 1999; Neumann et al. 2003), Margolies and Crawford (2008) predicted that positively valenced events might encourage use of the Moving Ego perspective and negatively valenced events might encourage use of the Moving Time perspective. Across three experiments, they observed an association between positive affect and the Moving Ego perspective (and, conversely, between negative affect and the Moving Time perspective), suggesting that the valence of an event can influence how people reason about time.<sup>6</sup>

Second, the language itself may play a role in the interpretive possibilities available to a comprehender. Although the ambiguity observed in English is evident in some other languages, such as Dutch (Elvevåg et al. 2011), cross-linguistic investigations of the *Next Wednesday's meeting* question have shown that this is not universally the case: when the question is translated into German, using the

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5 We thank an anonymous reviewer for bringing this to our attention.

6 It should be noted that while participants in the positive (enthusiasm) condition were more likely to describe themselves as approaching the event (in line with the Moving Ego perspective) and participants in the negative (dread) condition were more likely to describe the event as approaching themselves (in line with the Moving Time perspective), the valence of the event did not significantly affect whether the participants responded *Monday* or *Friday*. Margolies and Crawford (2008) offer two possible explanations for this apparent inconsistency, the first being that although people might have a tendency to imagine themselves approaching positive events (in line with the Moving Ego perspective), this effect is undermined by the tendency to want positive events to occur sooner (in line with the Moving Time perspective). The second possible explanation relates to the different nature of the two questions: whereas the ‘approach question’ relates to a spatial scene and may tap into a person’s underlying representations of space, McGlone and Harding’s (1998) ‘days question’ relates to a temporal scene and may tap into a person’s underlying representations of time. Although related, the two representations may remain somewhat distinct.

term *vorverlegen* for “moved forward”, the overwhelming majority of participants responded *Monday* (Bender et al. 2005), suggesting that the German question is not truly ambiguous. A similar preference for responding *Monday* has also been observed among speakers of Mandarin Chinese (Bender et al. 2010). Following up on these observations, preliminary cross-linguistic research investigating the *Next Wednesday’s meeting* question indicates that when translated into some languages, the question remains ambiguous, while in others, it does not (Duffy in preparation): Anecdotally, the question is ambiguous in Afrikaans (p.c. Hannelie Grobler 2011), Danish (p.c. Marie Jensen 2011) and Hungarian (p.c. Zoltán Kövecses 2011), much as it is in English. By contrast, the ambiguity is not apparent in languages such as Czech (p.c. Mirjam Fried 2011), Finnish (p.c. Tuomas Huomo 2011), Italian (p.c. Claudia Baldoli 2011) and Ukrainian (p.c. Olga Pykhtina 2011), for which *Friday* appears to be the only possible response. While these preliminary findings, pending further empirical analysis, should be taken with some caution, these cross-linguistic differences further counter the notion of the “neutral” context. They also highlight, as a method of best practice, the necessity of surveying participants’ native languages, as the interpretation of the question in a participant’s L1 may influence their interpretation of the question in L2. For instance, a native speaker of German might be more likely to infer an L1 interpretation and respond *Monday* to the question in English.<sup>7</sup>

## 4 Conclusion

Research examining interpretations of the temporally ambiguous *Next Wednesday’s meeting* question have largely been built on the assumption that participants may respond in a “neutral” context (Boroditsky and Ramscar 2002). While these studies have convincingly demonstrated a role for spatial thinking in the resolution of the temporal ambiguity, they have left unexamined a host of potential contributors to language interpretation and ambiguity resolution. By challenging the assumption of a “neutral” context, our study aims to round out the picture of contributors to language interpretation. Taken together, our findings suggest that individual differences in personality and lifestyle may influence people’s perspectives on the movement of events in time, suggesting a role for such individual factors in the interpretation of ambiguous language and the conceptualization of time. To reiterate Levine (2006: XVI):

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<sup>7</sup> To the best of our knowledge, our studies are the first to explicitly survey participants’ native language. As all our participants were native speakers of English from the UK, we can rule out cross-linguistic influences as a potential contributor.

... how people construe the time of their lives comprises a world of diversity. There are drastic differences on every level: from culture to culture, city to city, and from neighbor to neighbor.

In sum, our evidence combines with past findings to suggest that a complete understanding of responses to temporally ambiguous language might only be achieved through the joint consideration of individual factors as well as contextual priming.

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## References

- Alloway, Tracy P., Martin Corley & Michael Ramscar. 2006. Seeing ahead: Experiences and language in spatial perspective. *Memory and Cognition* 34, 380–386.
- Back, Mitja D., Stefan C. Schmukle & Boris Egloff. 2006. Who is late and who is early? Big Five personality factors and punctuality in attending psychological experiments. *Journal of Research in Personality* 40, 841–848.
- BBC News. 2008. *UK work week among EU's longest*. 4 September 2008. Available at: <http://news.bbc.co.uk/1/hi/7598467.stm/> [accessed October 2011].
- Bender, Andrea, Giovanni Bennardo & Sieghard Beller. 2005. Spatial frames of reference for temporal relations: A conceptual analysis in English, German, and Tongan. In B. G. Bara, L. Barsalou & M. Bucciarelli (eds.), *Proceedings of the 27th Annual Conference of the Cognitive Science Society*, 220–225. Mahwah: Lawrence Erlbaum Associates.
- Bender, Andrea, Sieghard Beller & Giovanni Bennardo. 2010. Temporal frames of reference: Conceptual analysis and empirical evidence from German, English, Mandarin Chinese, and Tongan. *Journal of Cognition and Culture* 10, 283–307.
- Boroditsky, Lera. 2000. Metaphoric structuring: Understanding time through spatial metaphors. *Cognition* 75(1), 1–28.
- Boroditsky, Lera & Michael Ramscar. 2002. The roles of body and mind in abstract thought. *Psychological Science* 13(2), 185–188.
- Cacioppo, John T., Joseph Priester & Gary G. Berntson. 1993. Rudimentary determinants of attitudes. II: Arm flexion and extension have differential effects on attitudes. *Journal of Personality and Social Psychology* 65, 5–17.
- Chen, Mark & John A. Bargh. 1999. Consequences of automatic evaluation: Immediate behavioural predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin* 25, 215–224.

- Clark, Herbert H. 1973. Space, time, semantics, and the child. In T. E. Moore (ed.), *Cognitive Development and the Acquisition of Language*, 27–63. New York: Academic Press.
- Davies, Mark. 2004–. *BYU-BNC*. (Based on the British National Corpus from Oxford University Press). Available at: <http://corpus.byu.edu/bnc/> [accessed November 2012].
- Directgov. 2012. *Holiday Entitlements: The Basics*. 7 March 2012. Available at: [http://www.direct.gov.uk/en/Employment/Employees/Timeoffandholidays/DG\\_10029788/](http://www.direct.gov.uk/en/Employment/Employees/Timeoffandholidays/DG_10029788/) [accessed March 2012].
- Duffy, Sarah E. In preparation. Moving beyond ‘Next Wednesday’: A cross-linguistic investigation.
- Elliot, Andrew J. & Todd M. Thrash. Approach-avoidance motivation in personality: Approach and avoidance temperaments and goals. *Journal of Personality and Social Psychology* 82, 804–818.
- Ellis, Albert & William J. Knaus. 1977. *Overcoming Procrastination*. New York: Signet Books.
- Elvevåg, Brita, Kim Helsen, Marc De Hert, Kim Sweers & Gert Storms. 2011. Metaphor interpretation and use: A window into semantics in schizophrenia. *Schizophrenia Research* 133(1–3), 205–211.
- Evans, Vyvyan. 2004. *The Structure of Time: Language, Meaning, and Temporal Cognition*. Amsterdam: John Benjamins.
- Evans, Vyvyan & Melanie Green. 2006. *Cognitive Linguistics: An Introduction*. Edinburgh: Edinburgh University Press.
- Eysenck, Hans J. 1952. *The Scientific Study of Personality*. London: Routledge and Kegan Paul.
- Ferrari, Joseph R. & Brett L. Beck. 1998. Affective responses before and after fraudulent excuses by academic procrastinators. *Education* 118(4), 529–538.
- Harriott, Jesse & Joseph R. Ferrari. 1996. Prevalence of chronic procrastination among samples of adults. *Psychological Reports* 73, 873–877.
- Haspelmath, Martin. 1997. *From Space to Time: Temporal Adverbials in the World’s Languages*. Munich: Lincom.
- Hauser, David J., Margaret S. Carter & Brian P. Meier. 2009. Mellow Monday and furious Friday: The approach-related link between anger and time representation. *Cognition and Emotion* 23(6), 1166–1180.
- Giambra, Leonard M., Reginald E. Quilter & Pamela B. Phillips. 1988. The relationship of age and extraversion to arousal and performance on a sustained attention task: A cross-sectional investigation using the Mackworth clock-test. *Personality and Individual Differences* 10(12), 1221–1228.
- Guardian. 2011. *The £135 University Lecture – but is it worth it?* 29 April 2011. Available at: <http://www.guardian.co.uk/education/mortarboard/2011/apr/29/university-lecture-fees-worth-it/> [accessed October 2011].
- Harmon-Jones, Eddie. 2007. Asymmetrical frontal cortical activity, affective valence, and motivational direction. In E. Harmon-Jones & P. Winkielman (eds.), *Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behaviour*, 137–156. New York: Guilford Press.
- Higgins, E. Tory. 1997. Beyond pleasure and pain. *American Psychologist* 52, 1280–1300.
- John, Oliver P. 1990. The “Big Five” factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (ed.), *Handbook of Personality: Theory and Research*, 66–100. New York: Guilford Press.

- John, Oliver P. & Sanjay Srivastava. 1999. The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (eds.), *Handbook of Personality: Theory and Research*, 2<sup>nd</sup> edition, 102–138. New York: Guilford Press.
- John, Oliver P., Laura P. Naumann & Christopher J. Soto. 2008. Paradigm shift to the integrative Big-Five trait taxonomy: History, measurement and conceptual issues. In O. P. John, R. W. Robins & L. A. Pervin (eds.), *Handbook of Personality: Theory and Research*, 3<sup>rd</sup> edition, 114–158. New York: Guilford Press.
- Johnson, Judith L. & A. Michael Bloom. 1995. An analysis of the contribution of the five factors of personality to variance in academic procrastination. *Personality and Individual Differences* 18, 127–133.
- Kranjec, Alexander. 2006. Extending spatial frames of reference to temporal concepts. In K. Forbus, D. Gentner & T. Regier (eds.), *Proceedings of the 28<sup>th</sup> Annual Conference of the Cognitive Science Society*, 447–452. Mahwah: Lawrence Erlbaum Associates.
- Lakoff, George. 1993. The contemporary theory of metaphor. In A. Ortony (ed.), *Metaphor and Thought*, 202–251. Cambridge: Cambridge University Press.
- Lakoff, George & Mark Johnson. 1980. *Metaphors We Live By*. Chicago: University of Chicago Press.
- Lakoff, George & Mark Johnson. 1999. *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.
- Lay, Clarry H. 1986. At last, my research article on procrastination. *Journal of Research in Personality* 20, 474–495.
- Lay, Clarry H. 1997. Explaining lower-order traits through higher-order factors: The case of trait procrastination, conscientiousness and the specificity dilemma. *European Journal of Personality* 11, 267–278.
- Levine, Robert. 1997. *A Geography of Time: The Temporal Misadventures of a Social Psychologist, or How Every Culture Keeps Time Just a Little Bit Differently*. New York: Basic Books.
- Margolies, Skye O. & L. Elizabeth Crawford. 2008. Event valence and spatial metaphors of time. *Cognition and Emotion* 22(7), 1401–1414.
- Matlock, Teenie, Michael Ramscar & Lera Boroditsky. 2005. On the experiential link between spatial and temporal language. *Cognitive Science* 29, 655–664.
- Matlock, Teenie, Keven J. Holmes, Mahesh Srinivasan & Michael Ramscar. 2011. Even abstract motion influences the understanding of time. *Metaphor and Symbol* 26, 260–271.
- McGlone, Matthew S. & Jennifer L. Harding. 1998. Back (or forward?) to the future: The role of perspective in temporal language comprehension. *Journal of Experimental Psychology: Learning, Memory and Cognition* 24, 1211–1223.
- Milgram, Norman, Gil Mey-Tal, Yuval Levison. 1998. Procrastination, generalized or specific, in college students and their parents. *Personality and Individual Differences* 23, 1–20.
- Milgram, Norman N. & Rachel Tenne. 2000. Personality correlates of decisional and task avoidant procrastination. *European Journal of Personality* 14, 141–156.
- Moore, Kevin E. 2006. Space to time mappings and temporal concepts. *Cognitive Linguistics* 17, 199–244.
- Neumann, Roland, Jens Forster & Fritz Strack. 2003. Motor compatibility: The bidirectional link between behavior and evaluation. In J. Musch & K. C. Klauer (eds.), *The Psychology of Evaluation: Affective Processes in Cognition and Emotion*, 371–391. Mahwah: Lawrence Erlbaum Associates.

- Núñez, Rafael. 2007. Inferential statistics in the context of empirical cognitive linguistics. In M. González-Márquez, I. Mittelberg, S. Coulson & M. Spivey (eds.), *Methods in Cognitive Linguistics*, 87–118. Philadelphia: John Benjamins.
- Núñez, Rafael, Benjamin Motz & Ursina Teuscher. 2006. Time after time: The psychological reality of the Ego- and Time-Reference-Point distinction in metaphorical construals of time. *Metaphor and Symbol* 21, 133–146.
- Núñez, Rafael & Eve Sweetser. 2006. With the future behind them: Convergent evidence from Aymara language and gesture in the crosslinguistic comparison of spatial construals of time. *Cognitive Science* 30, 401–450.
- NUS-HSBC. 2011. *Student Experience Report*. London: National Union of Students. Available at: <http://www.nus.org.uk/PageFiles/12238/NUS-HSBC-Experience-report-web.pdf> [accessed March 2012].
- Office for National Statistics. 2010. *Labour Market Profile Great Britain*. Durham: Nomis. Available at: <http://www.nomisweb.co.uk/reports/lmp/gor/2092957698/report.aspx/> [accessed October 2011].
- Oxford English Dictionary: *The Definitive Record of the English Language*. 2007. 3<sup>rd</sup> edition. Oxford: Oxford University Press.
- Radden, Günter. 2004. The metaphor TIME AS SPACE across languages. In N. Baumgarten, C. Böttger, M. Motz & J. Probst (eds), *Übersetzen, interkulturelle Kommunikation, Spracherwerb und Sprachvermittlung – Das Leben mit Mehreren Sprachen: Festschrift für Juliane House zum 60 Geburtstag*, 226–239. Aks-verlag: Bochum, Germany.
- Ramscar, Michael, Teenie Matlock & Melody Dye. 2010. Running down the clock: The role of expectation in our understanding of time and motion. *Language and Cognitive Processes* 25(5), 589–615.
- Revelle, William, Michael S. Humphreys, Lisa Simon & Kirby Gilliland. 1980. The interactive effect of personality, time of day and caffeine: A test of the arousal model. *Journal of Experimental Psychology: General* 109(1), 1–31.
- Richmond, Jill, J. Clare Wilson & Jörg Zinken. 2012. A feeling for the future: How does agency in time metaphors relate to feelings? *European Journal of Social Psychology* 42(7), 813–823.
- Rivera, Carol. 2007. *Time Management*. Delhi: Global Media.
- Ruscher, Janet B. 2011. Moving forward: The effect of spatiotemporal metaphors on perceptions of grief. *Social Psychology* 42(3), 225–230.
- Schouwenburg, Henri C. & Clarry H. Lay. 1995. Trait procrastination and the Big Five factors of personality. *Personality and Individual Differences* 18, 481–490.
- Solomon, Laura J. & Esther D. Rothblum. 1984. Academic procrastination: Frequency and cognitive-behavioural correlates. *Journal of Counseling Psychology* 31, 504–510.
- Sullivan, Jessica L. & Hilary C. Barth. 2012. Active (not passive) spatial imagery primes temporal judgements. *The Quarterly Journal of Experimental Psychology* 65(6), 1101–1109.
- Vallacher, Robin R. & Daniel M. Wegner. 1989. Levels of personal agency: Individual variation in action identification. *Personality Processes and Individual Differences* 57(4), 660–671.
- Work4Northumbria. 2012. *Current Vacancies*. Northumbria University: Newcastle-upon-Tyne. Available at: <http://work4.northumbria.ac.uk/vacancies/> [accessed January 2012].
- Yu, Ning. 1998. *The Contemporary Theory of Metaphor: A Perspective from Chinese*. Amsterdam and Philadelphia: John Benjamins.

## Appendix

**Table 1:** Temporal instances of *approaching* in the BYU-BNC

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Token sample: 200

Token frequency: 20 (10%)

Moving Time (MT) frequency: 12 (60%)

Moving Ego (ME) frequency: 8 (40%)

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1	Then he washed his hands. Christmas was <i>approaching</i> and the shop windows began to fill with seasonal tableaux.	MT
2	They made love as though tomorrow was fast <i>approaching</i> , and with it imminent departure.	MT
3	Our mission? To film arctic foxes facing up to the rigours of <i>approaching</i> winter. We were not, however destined to be alone	MT
4	It was several weeks later. There was a smell of <i>approaching</i> summer in the air. The Sunday school had closed	MT
5	Another Friday 13th was <i>approaching</i> so I was certain we could expect another move, maybe the big one.	MT
6	of the play. The scene with Lesley-Jane started. Everyone knew the climax was <i>approaching</i> .	MT
7	With Christmas <i>approaching</i> police believe the thieves may try to sell off the birds to dealers	MT
8	It is <i>approaching</i> midnight in Munster when the recovery crew return to conclude another busy day for the	ME
9	The time might be <i>approaching</i> when the viability of employing these vase armies of professionals needs to be reappraised.	MT
10	the time was fast <i>approaching</i> when the reverse became true and the king would defend the church from the plans	MT
11	You are a destroyer, MacQuillan, but the time is <i>approaching</i> when you will be destroyed. No over-use of capitals, no underlining.	MT
12	This time with the Parliamentary Recess fast <i>approaching</i> , the Government urged the Commons not to insist on its disagreement with the Lords	MT
13	The indenture suggests that he was then <i>approaching</i> the end of his career. A citizen's will of July 1449 implies that	ME
14	he stares into his Guinness with the glum patience of a headmaster <i>approaching</i> retirement.	ME
15	Imperial Adventures by Dea Birkett Macmillan, 25 IN January 1892 Mary Kingsley, <i>approaching</i> 30, was her mother's nurse in Cambridge.	ME
16	It took Preston back fifteen years. Like the problem. It was a problem of youth, not of <i>approaching</i> middle age.	MT
17	his courage and sense of public duty there is no need to enlarge. Though <i>approaching</i> early middle age, on the outbreak of the last world war he at once	ME
18	Young people <i>approaching</i> the age when they would no longer be the formal responsibility of the local authorities	ME
19	The fact that she was <i>approaching</i> thirty can not have made the decision any easier. Neither can the marriage of her younger sister	ME
20	These fortunate people are the first generation <i>approaching</i> retirement who have not suffered a significant interruption in their career because of the war	ME

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**Table 2:** Temporal instances of *coming up* in the BYU-BNC

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Token sample: 200  
 Token frequency: 17 (8.5%)  
 Moving Time (MT) frequency: 9 (53%)  
 Moving Ego (ME) frequency: 8 (47%)

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1	The time is just <i>coming up</i> to twenty-one minutes past seven o'clock. Tonight we are certainly – hopping – from one subject to another.	ME
2	We exhibited there. But there's an International Business Fair <i>coming up</i> at the end of this month.	MT
3	Symphony No 29 was written in the later part of 1773. Mozart was then <i>coming up</i> to his eighteenth birthday, but already a mature master	ME
4	they will tell you everybody they know who's going to have er a wedding <i>coming up</i> and then you can write to them.	MT
5	their fortunes in the opinion polls did they decide that, with the general <i>coming up</i> , and the prospect of their being routed, they should do something.	MT
6	What we're gonna do now, it's just <i>coming up</i> to twenty past three, so we'll take a tea break and then	ME
7	It's <i>coming up</i> for midnight,' said Shirley, with some relief, pointing at the quartz carriage clock on the mantelpiece	ME
8	again haven't asked Spike about finding out erm (pause) when and where by-elections are <i>coming up</i> . (SP:PS1R8) I don't think there are any coming up.	MT
9	eye on a little set of drawers, yew-wood veneer. Lucy's birthday's <i>coming up</i> , November the seventh . . .”	MT
10	And with several parties <i>coming up</i> this autumn-winter the prospects for the coming months are looking good.	MT
11	If you've got a birthday or something <i>coming up</i> and if somebody wants to know what to buy you (pause) that's what	MT
12	No I haven't got me outfit yet (SP:PS01V) No, when is your wedding <i>coming up</i> ? (SP:PS01T) April the fourth (SP:PS01V) Ooh is it, ooh (SP:PS01T)	MT
13	so Dave's forty one? (SP:PS09U) Forty, forty last June, he's <i>coming up</i> to forty one this year (SP:PS09T) forty one in May? (SP:PS09U) Yeah (pause)	ME
14	Runaway wins against Newport and Bridgend has boosted confidence but the crunch is <i>coming up</i> . . . time for Gloucester to fight their way out of trouble	MT
15	seven (SP:PS01V) Oh that's fantastic (SP:PS01T) Aye (SP:PS01T) you know he's twenty seven <i>coming up</i> you know	ME
16	I will certainly er stay in order but (pause) the British electorate <i>coming up</i> to June the ninth and the European er elections will not know even if	ME
17	they do not face the same regeneration problem; only now are their oldest consultants <i>coming up</i> to retirement.	ME

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