CHAPTER 4

Self-Concept and Time Representation: Do "I" Move Toward the Future While the Future Moves Toward "Us"?

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ABSTRACT

In an attempt to better understand cross-cultural variation in the proclivity for the ego- and time-moving representations, this paper investigated whether differences in self-concept (interdependent vs. independent) are related to the way that people represent time. This study builds upon research that has documented widespread downstream consequences of self-concept and research that conceptually links self-concept to the ego- and time-moving representations via differences in agency and temporal proximity. We hypothesized that an independent self-concept is related to an ego-moving representation and an interdependent self-concept to a time-moving representation. Six studies were conducted, using both correlational and experimental designs in which either self-concept or time representation was manipulated. Results did not support the hypothesized relation suggesting that it is unlikely that self-concept underlies the cross-cultural variation in the proclivity for the ego- and time-moving representation. In discussing these results, this paper highlights some theoretical gaps and inconsistencies within the field as well as some methodological issues that future research will need to address.

Keywords: self-concept; time representation; ego-moving; time-moving; culture; independent; interdependent

INTRODUCTION

When thinking about the passage of time, people can envision themselves as moving entities, approaching stationary future events and leaving stationary past events behind, or envision the events as moving, approaching them, and then passing them by. Consequently, they can talk about events by saying either something like *we are fast approaching the event* or *the event is fast approaching*. These two ways of representing and talking about time are termed the ego- and time-moving representations respectively and have been the focus of a vast amount of research (Boroditsky & Ramscar, 2002; Duffy, Feist, & McCarthy, 2014; Gentner, Imai, & Boroditsky, 2002; Lai & Boroditsky, 2013; Lee & Ji, 2014; McGlone & Harding, 1998; Richmond, Wilson, & Zinken, 2012).

Research has shown that selecting one of these two ways to talk and think about time does not occur arbitrarily but depends on a range of factors. For speakers of English, individual differences in terms of personality and emotional state (Duffy & Feist, 2014; Duffy et al., 2014; Hauser et al., 2009; Richmond et al., 2012) as well as situation specific characteristics, such as spatial cues (Alloway et al., 2002; Boroditsky, 2000; Boroditsky & Ramscar, 2002; McGlone & Harding, 1998) or the valence of the event (Margolies & Crawford, 2008; McGlone & Pfiester, 2009), influence whether the ego- or time-moving representation is preferred. Interestingly, large cross-cultural variation has also been documented vis-à-vis time representation (Brislin & Kim, 2003; de la Fuente et al., 2014; Levine, 2006; Sullivan et al., 2016), with several studies showing that cultural groups differ in terms of their proclivity for the ego-moving or time-moving representation as well (Bender et al., 2010; Dahl, 1995; Lai & Boroditsky, 2013). We broaden the scope of this research by considering the role of self-concept – a key dimension of cultural difference with widespread downstream consequences – in relation to the ego- and time-moving representations.

The objective of the current research is to investigate whether self-concept, one of the most widely studied cultural difference variables in cultural psychology, is related to a preference for either the ego-moving or time-moving representation. We build upon three different research insights: (a) there is some overlap between the variation in preference for the ego-moving or time-moving representation and variation in self-concept (Bender et al., 2010; Dahl, 1995; Hofstede, 2001; Lai & Boroditsky, 2013; Radanielina-Hita, 2010; Richmond et al., 2012; Rothe-Wulf et al., 2015), (b) self-concept has a wide range of downstream consequences, *inter alia* on temporal cognition (Kühnen et al., 2013; Kühnen, Hannover, & Schubert, 2001; Lee, Lee, & Kern, 2011; Spassova & Lee, 2013), and (c) conceptually, differences associated with variation in self-concept resemble differences associated with variation in time representation (Duffy

& Feist, 2014; Duffy et al., 2014; Kühnen et al., 2013; Lee et al., 2011; Richmond et al., 2012; Spassova & Lee, 2013). By investigating this, we aim to add to the understanding of cultural variation in time representation and extend the literature on the downstream consequences of culture, specifically self-concept.

Cultural Variation in Time Representation and Self-Concept

Researchers studying the ego- and time-moving representations across the globe have noted that cultures differ in their proclivity for the ego-moving or time-moving representation (Bender et al., 2010; Dahl, 1995; Lai & Boroditsky, 2013). While certain cultures indeed employ, or even prefer, the ego-moving representation, other cultures have a strong preference for the time-moving representation. For example, when presented with an ambiguous time question such as: *Next week Wednesday's meeting has been moved forward by two days. On what day is the meeting now?*, Swedish speaking participants indicate that the meeting will move to *Friday*, an answer consistent with an ego-moving representation (Rothe-Wulf et al., 2015). Most (American) English speakers also indicate that the meeting will move to *Friday*, though a significant percentage indicates the meeting will move to *Monday*, an answer consistent with the time-moving response (Lai & Boroditsky, 2013; Rothe-Wulf et al., 2015). The preference for the ego-moving representation by Americans has also been corroborated by our own data: when 77 participants, recruited via Amazon's Mechanical Turk, were asked the ambiguous time question, 62 (80.52%) of them indicated the meeting had moved to *Friday* (unpublished raw data). Speakers of (British) English, like Americans, employ both the ego-moving representation and the time-moving representation when answering the ambiguous time question: just under half of the participants provide an answer to the ambiguous time question consistent with the ego-moving representation (Richmond et al., 2012). In sharp contrast, speakers of Mandarin and speakers of German seem to prefer the time-moving representation: when responding to the ambiguous time question, they almost exclusively indicate the meeting will move to *Monday*, the answer consistent with the time-moving representation (Bender et al., 2010; Lai & Boroditsky, 2013; Rothe-Wulf et al., 2015). Similarly, speakers of Malagasy also favor the time-moving representation over the ego-moving representation: when talking about events the observer is always construed as stationary and the event reaches or catches up with the observer (Dahl, 1995). So what else distinguishes these countries, and might, in part, be related to differences between the proclivities for the ego- and time-moving representations?

Researchers working on understanding cultural differences across countries have largely focused on the distinction between an independent and an interdependent

self-concept. Self-concept concerns the way the self is viewed in relation to others. Individuals with an independent self-concept see the self as independent from others, as intrinsically agentic with unique characteristics and dispositions. Individuals with an interdependent self-concept see the self as dependent on others, as fundamentally embedded in relational context (Markus & Kitayama, 1991; Triandis, 1989). Originally, self-concept was seen as the factor that contrasted individualistic cultures (e.g., the US, Great Britain) from collectivistic cultures (e.g., China, Japan). Nowadays, however, it is increasingly recognized that self-concept does not only operate on a cultural level but also on an individual and situational level (Brewer & Gardner, 1996; Oyserman & Lee, 2008; Singelis, 1994; Trafimow et al., 1991). Researchers have consequently been able to complement cross-cultural comparisons with (cultural) priming and measurements at the individual level. This allows for stronger (causal) inferences concerning the relation between cultural variables like self-concept on cognition, causal attribution, behavior, motivation, values, and emotions whilst avoiding some of the complications that arise when adapting measures for other cultural groups (Gardner et al., 1999; He & van de Vijver, 2012; Oyserman, 2011; Oyserman & Lee, 2008)

When comparing the countries for which the proclivity for the ego- or time-moving representation was described above, self-concept is one aspect that clearly distinguishes them. Whilst the US, UK, Sweden, and Germany are considered individualistic countries with an independent self-concept, China and Madagascar are considered collectivistic countries with an interdependent self-concept (Hofstede, 2001; Radanielina-Hita, 2010). With Germany as an exception, it seems that countries that employ or even prefer the ego-moving representation are individualistic countries with an independent self-concept. Countries that prefer the time-moving representation are mostly collectivistic countries with an interdependent self-concept. Below we discuss how self-concept and time representation are related in other ways as well.

The Downstream Consequences of Self-Concept

Self-concept has a wide range of downstream consequences; it has been implicated not only in self-representation and self-description (Brewer & Gardner, 1996; Ross et al., 2002; Trafimow et al., 1991) but also in values (Gardner et al., 1999; Triandis et al., 1990), well-being (Cross, Gore, & Morris, 2003), risk-taking (Mandel, 2003; Weber & Hsee, 1998), motivation (Lee, Aaker, & Gardner, 2000), social behavior (Holland, Roeder, van Baaren, Brandt, & Hannover, 2004; Utz, 2004; van Baaren, Maddux, Chartrand, de Bouter, & van Knippenberg, 2003), online endorsements (Bernritter et al., 2017), and, most notably, cognition (Aaker & Lee, 2001; Kühnen et al., 2013; Kühnen, Hannover, & Schubert, 2001; Nisbett, 2003; Ybarra & Trafimow, 1998). In the case of cognition, Kühnen

et al. (2001) for example showed that priming participants with an independent self-concept, compared to an interdependent self-concept, leads participants to process visual stimuli more independently from the context in which they appear (Study 1, Study 2, and Study 4). In contrast, priming participants with an interdependent self-concept, compared to an independent self-concept, leads participants to engage in more context-dependent thinking (Study 3). Similarly, in relation to causal attribution, Kühnen et al. (2013) showed that priming participants with an interdependent self-concept reduces dispositional attributions when given a short and unconvincing essay (i.e., the low diagnostic condition) as opposed to a long and convincing essay. Both these results mimic observed differences across individualistic and collectivistic cultures (Kühnen, Hannover, Roeder, et al., 2001; Miyamoto & Kitayama, 2002).

Additionally, there is initial evidence that self-concept is implicated in time representation. Research by Lee et al. (2011) as well as by Spassova and Lee (2013) suggests that an independent self-concept leads to perceiving future events as more distant (further in the future) and an interdependent self-concept to perceiving seeing future events as more proximal (closer to the present). Moreover, a match in terms of temporal distance – thus a future event that occurs soon for participants with an interdependent self-concept and late for participants with an independent self-concept – intensifies/polarizes their motivation/evaluation compared to a mismatch (Lee et al., 2011; Spassova & Lee, 2013).

Conceptual Overlap Between Self-Concept and Time Representations

The research showing a connection between self-concept and perceptions of temporal proximity forms the basis for the hypothesized relation between self-concept and the ego- and time-moving representations. Namely, inherent to the two time representations is the contradiction between *futurewards* and *pastwards* movement. Whereas in the ego-moving representation forward movement is construed as moving something further along in the future, in the time-moving representation forward movement is construed as moving something closer to the present (for a more detailed explanation and conceptual framework in terms of frames of reference, see Bender & Beller, 2014; Bender et al., 2010). The *futurewards* and *pastwards* distinction between the ego- and time-moving representations is corroborated by empirical findings that link procrastination, which involves moving tasks further along in the future, to the ego-moving representation and conscientiousness, which involves moving tasks closer to the present, to the time-moving representation (Duffy & Feist, 2014; Duffy et al., 2014). This *futurewards* and *pastwards* distinction is similar to the distinction made in the research on perceptions of temporal proximity, which are, as mentioned above, explained by differences in self-concept (Lee et al., 2011; Spassova &

Lee, 2013). In addition, the research showing a connection between self-concept and perceptions of temporal proximity is based on the notion that an independent self-concept is linked to a promotion focus, whereas an interdependent self-concept is linked to a prevention focus (Aaker & Lee, 2001; Hamamura, Meijer, Heine, Kamaya, & Hori, 2009; Lockwood, Marshall, & Sadler, 2005). A promotion and prevention focus are linked to an approach and avoidance motivation respectively (Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, & Idson, 1998; Higgins, 1997), and individual-difference research linking time representation to valence as well as anger, in turn, shows that an approach motivation underlies an ego-moving representation and an avoidance motivation underlies a time-moving representation (Hauser et al., 2009; Margolies & Crawford, 2008; McGlone & Pfiester, 2009).

The above research thus not only makes self-concept a likely candidate for influencing cognition about time but predicts the specific way in which self-concept and time representation are connected. Namely, it predicts a link between an independent self-concept and an ego-moving representation and a link between an interdependent self-concept and a time-moving representation. This is further supported by research which highlights that personal agency is central to both an ego-moving representation and an independent self-concept and external agency to a time-moving representation and an interdependent self-concept. For instance, research by Richmond et al. (2012) has linked the ego-moving representation, compared to the time-moving representation, to higher scores on a the Behavioral Identification Form (Vallacher & Wegner, 1989) which taps into personal agency. In addition, a study by Duffy and Feist (2014) has found a relation between lifestyle and time representation: people who are in control of structuring their own time to a large extent (e.g., students) use the ego-moving representation; people whose time is structured by external factors (e.g., administrators) use the time-moving representation. The link between an independent self-concept and dispositional attributions (personal agency) and an interdependent concept and situational attributions (external agency) was also already noted in the section describing the downstream consequences of self-concept (Kühnen et al., 2013). The link is further corroborated by research comparing causal attribution and agency across cultures: individualistic countries with an independent self-concept emphasize individual agency and dispositional explanations whereas collectivistic countries with an interdependent self-concept emphasize relational context and situational explanations (Menon et al., 1999; Miyamoto & Kitayama, 2002; Morris & Peng, 1994).

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The Current Research: Self-Concept and Time Representation

In this study, we investigate the relation between self-concept and the ego- and time-moving representations. We aim to not only contribute to the growing field of research which has demonstrated the widespread downstream consequences of self-concept on *inter alia* temporal cognition, but also to the area of research that tries to understand (cultural) differences in time representation. We posit that an independent self-concept, predominantly associated with individualistic cultures, with a focus on the agentic individual, and with construing events as further into the future, is perhaps more compatible with an ego-moving representation, which is also predominantly found in individualistic cultures, associated with high personal agency and *futurewards* movement. Similarly, we posit that interdependent self, predominantly associated with collectivistic cultures, with a focus on external agency, and with construing events as closer to the present, is perhaps more compatible with a time-moving representation, which is also predominantly found in collectivistic cultures, associated with low personal agency and *pastwards* movement. To test this hypothesis we conducted six studies, two of which explored the relation between self-concept and time representation using a correlational design (Study 1 and Study 2) and four using an experimental design where either self-concept (Study 3, Study 4, and Study 5) or time representation (Study 6) was manipulated.

General Information Studies

For all lab studies (Study 1, Study 5, and Study 6), participants provided written consent before being guided to the cubicle. The consent form provided them with information on the general requirements of the study, approximate duration, confidential treatment of their data, and the fact that their participation was voluntary and could be terminated at any time. All studies were conducted on the computer. For the online studies (Study 2, Study 3, and Study 4), the same information was given before participants were asked to indicate their willingness to participate. At the end of each study, participants filled in demographic information, indicated what they thought the study was about, were debriefed, and thanked. Analyses were carried out using SPSS software. We followed Dienes' (2014) recommendation and used Bayesian statistic to calculate Bayes Factors (in JASP) for the hypothesized effects in order to assess whether or not our data are more likely under the alternative or the null hypothesis (see Jeffreys, 1961 and Lee & Wagenmakers, 2014, for a categorization of evidential strenghth of the Bayes Factors). All data and measures have been made publicly available via the Open Science Framework and can be accessed at https://osf.io/f34xp/.

STUDY 1

In Study 1, we capitalized on the fact that self-concept varies across individuals within the same culture. We investigated whether self-concept is related to the ego- and time-moving representations by conducting a correlational study using Dutch participants. The measures of interest, self-concept and time representation, were included as part of a larger study.

Method

Participants

Students from the *Vrije Universiteit Amsterdam* (*N* = 218; 99 males and 119 females) with an average age of 20.33 (*SD* = 3.45) were recruited via the university's subject pool and participated in this study conducted on the university campus in the psychology lab. Participants were given monetary compensation in exchange for their participation.

Materials and procedure

First, self-concept was measured in two different ways: with the Inclusion of Other in the Self Scale (IOS) adapted from Aron, Aron, and Smollan (1992; see also Li, 2002 and Uleman, Rhee, Bardoliwalla, Semin, & Toyama, 2000) and with an adapted short version of the questionnaire by Oyserman (1993). The order of these two questionnaires was randomized.

The IOS asks participants to choose between 7 pairs of circles with an increasing amount of overlap. Participants are told that for each pair, one circle represents them, where the other represents some other. We adapted the instructions so that in one item the other represented their family and in the other item the other represented their friends. Following Eisinga, Grotenhuis, and Pelzer's recommendation (2013), we looked at the Spearman-Brown reliability estimate for this two-item scale which was .468. Participants were asked to choose the pair of circles that best describes their relation with their family and their friends in both items. The two items were presented in random order and scores on these items were averaged to create an IOS index.

 Oyserman's questionnaire provides participants with 22 statements (see Appendix A): 11 statements gauged an independent self-concept (individualistic cultural mindset; e.g., "My personal attributes are what make me who I am"; α = .640) and the other 11 gauged an interdependent self-concept (collectivistic cultural mindset, e.g., "If you know the groups I belong to, you'll know who I really am"; α = .656). Participants

were asked to indicate to what extent they agree or disagree on a 5-point scale (1 = completely disagree; 5 = completely agree). Statements were translated into Dutch by the authors and presented in random order. The interdependent items were averaged to create an interdependent index and the independent items were averaged to create an independent index.

After the self-concept measures, time representation was gauged using the ambiguous Wednesday time question (Boroditsky & Ramscar, 2002; McGlone & Harding, 1998; Rothe-Wulf et al., 2015) which was translated into Dutch by the authors (see Appendix B). Participants were asked what day the meeting would take place now that it was moved forward by two days. A *Monday* answer is indicative of a time-moving representation whereas a *Friday* answer is indicative of an ego-moving representation. The answer format was open-ended.

Results

Time representation

Five participants (2.29%) were excluded from the analyses because they provided an answer other than *Monday* or *Friday* to the ambiguous Wednesday question. A total of 151 participants (70.89%) indicated the meeting had moved to *Monday* meaning that they applied a time-moving representation, and 62 participants (29.11%) indicated the meeting had moved to *Friday* meaning that they applied an ego-moving representation.

Self-concept and time representation

Contrary to expectation, an independent sample t-test indicated that participants who gave an ego-moving consistent answer in response to the ambiguous time questions did not report significantly lower inclusion of family and friends in the self as measured by the IOS (M = 4.87, SD = .95) than participants who applied a time-moving representation (M = 4.84, SD = 1.11), t(211) = -.165, p = .869, BF_{01} = 6.04.

In addition, an independent samples t-test indicated that participants who gave an ego-moving consistent answer in response to the ambiguous time questions did not report significantly higher independence (M = 3.80, SD = .39) as gauged by Oyserman's questionnaire than participants who gave a time-moving consistent answer (M = 3.72, SD = .39), t(211) = -1.362, p = .175, BF_{01} = 2.59. Likewise, an independent sample t-test indicated that participants who gave a time-moving consistent answer in response to the ambiguous time questions did not report significantly higher interdependence

(M = 3.27, SD = .44) as gauged by Oyserman's questionnaire than participants who gave an ego-moving consistent answer (M = 3.29, SD = .45), $t(211)$ = -.361, p = .718, BF_{01} = 5.76.

Discussion

This study did not find an association between the ego- and time-moving representations and an independent and interdependent self-concept respectively. This may be due to a low reliability of the self-concept measures. For Oyserman's questionnaire, reliability was for example lower than reported elsewhere (Oyserman, 1993). Also, this questionnaire is geared towards gauging endorsement of individualism vs. collectivism. Even though self-concept and whether people use idiocentric aspects or social identities to define the self are an integral part of the individualism-collectivism distinction and are reflected in the items, it might be of interest to include measures that more narrowly tap into self-concept. In the next studies, we have therefore included another measure of self-concept.

As for the IOS, even though reliability is difficult to assess for a two-measure item, the low reliability indicates that the degree to which people included family in the self did not necessarily match up with the degree to which they included friends. Whether this is in line with previous literature is harder to say as researchers working with the IOS have each used slightly different versions (from single- to seven-items scales) and have not always reported the overlap between family and friends (Aron et al., 1992; Li, 2002; Uleman et al., 2000). The low convergence might be specific to the age group we had (young students). If this is the case then it should be better in an older sample; we have included older samples in Study 2, 3 and 4.

To our knowledge, this is the first study in which time representation was investigated in a healthy Dutch population (see Elvevåg, Helsen, De Hert, Sweers, & Storms, 2011, for a study on time representation amongst Belgium patients suffering from schizophrenia). The results indicate that the majority of Dutch participants seem to use the time-moving representation when asked an ambiguous time question, although almost a third of the participants gave an answer consistent with an ego-moving representation. The preference for the time-moving representation matches the results found by Rothe-Wulf et al. (2015) for German participants, although they were more unanimous than the Dutch participants. This correspondence is perhaps not surprising given that the Dutch language and culture is very similar to the German language and culture. The fact that Swedes are also quite similar in terms of culture (and less so in language) but have the opposite preference would suggest that the German-Dutch similarity is perhaps more due to language than culture. This notion of

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language playing and important role is also corroborated by Lai and Boroditsky (2013) who showed that the frequency in which the ego- and time-moving representations occur in English and Mandarin determines which representation speakers of these languages use to answer the ambiguous question. Seeing that ego-moving representations does exist in both the Dutch and German language, it would be interesting to explore their preference for the ego- and time-moving representations using other measures, for example by analyzing large corpora of spoken and written language to see which one of the two representations is used more often (see McGlone & Pfiester, 2009, for an exampe). For the purpose of uncovering whether self-concept is related to the ego- and time-moving representations though, it might be better to focus on a cultural group were it is established that both representations are frequent and employed regularly. For the next studies we have therefore focused on an American population.

STUDY 2

Like Study 1, Study 2 investigated whether self-concept is related to the ego- and time-moving representations by conducting a correlational study. This time, however, we conducted the study using an American sample (not recruited via the university) and included a different measure of self-concept alongside the IOS, namely the Relational-Interdependent Self-Concept Scale (RISC; Cross, Bacon, & Morris, 2000). The RISC was specifically designed to gauge an interdependent self-concept, operationalized at the individual level, and suitable for differentiating self-concept amongst Western populations.

Method

Participants

Participants (*N* = 151) were recruited via Amazon's Mechanical Turk. We only accepted 'Turkers' who were located in the US and with a 95% or higher approval rate to ensure high quality participants in the sample. All participants were native speakers of English and passed a screening test included to test whether they read and followed instructions (see Appendix C). Two participants were excluded from analysis as they indicated the same answer on each question (including questions that were reverse scored) and were presumed to not have answered truthfully. A total of 149 participants (85 males and 64 females) with an average age of 33.68 (*SD* = 10.54) were retained for analysis. Participants were given monetary compensation in exchange for their participation.

Materials and procedure

Self-concept was gauged using the IOS (r = .652) also used in Study 1 and the RISC scale (α = .940). The RISC scale provides participants with 11 statements (e.g., "My close relationships are an important reflection of who I am.") to which they are asked to indicate their level of agreement using a 7-point scale (1 = strongly disagree; 7 = strongly agree) (see Appendix D). The 11 statements were presented in random order. The items were averaged to create an interdependent index.

Time representation was gauged using two ambiguous time questions and using Margolies and Crawford's question (2008; see Appendix B). The ambiguous time questions consisted of the same ambiguous Wednesday question as in Study 1 and a variation on this question that asks participants about a 12 o'clock meeting being moved forward by two hours. Margolies and Crawford's question asks participants to choose between an ego- and time-moving statement: "I am approaching the meeting" or "The meeting is approaching". The order of these two options was randomized. The order of the self-concept measures and the time representation questions was randomized.

Results

Time representation

In regards to the two ambiguous time questions, 53 participants (35.6%) gave answers both consistent with a time-moving representation, 74 participants (49.7%) gave answers both consistent with an ego-moving representation, and 22 participants (14.8%) gave mixed answers. As it is not clear what representation this later group prefers these participants were excluded from the analysis involving the ambiguous time questions (Núñez & Sweetser, 2006).

In regards to Margolies and Crawford's question, 68 participants (45.6%) chose the time-moving option ("The meeting is approaching") whereas 81 participants (54.4%) choose the ego-moving option ("I am approaching the meeting").

A chi-square analysis revealed there was a significant association between the time representation as gauged by the ambiguous question and the time representation gauged by Margolies and Crawford's question, $\chi^2(1)$ = 7.647, p = .007. A total of 80 participants (63%) were consistent in the representation they applied to the ambiguous time questions and Margolies and Crawford's question (both time-moving or both ego-moving), where 47 participants (37%) were not (see Table 1).

TABLE 1. Number of Ego- and Time-Moving Responses to the Ambiguous Time Questions and Margolies and Crawford's Question

Ambiguous Time Question	Margolies and Crawford's Question		Total
	Time-moving	Ego-moving	
Time-moving	31	22	53
Ego-moving	25	49	74
Total	56	71	127

Self-concept and time representation

Contrary to expectation, an independent sample *t*-test indicated that participants who applied an ego-moving representation to the ambiguous time questions did not score significantly lower on interdependence as measured by the RISC (*M* = 4.52, *SD* = 1.24) than participants who applied a time-moving representation (*M* = 4.57, *SD* = 1.19), *t*(125) = .211, *p* = .833, BF_{01} = 5.11. Also contrary to expectation, an independent sample *t*-test indicated that participants who chose the ego-moving option on Margolies and Crawford's question did not score significantly lower on interdependence as measured by the RISC (*M* = 4.68, *SD* = 1.23) than participants who chose the time-moving option (*M* = 4.65, *SD* = 1.16), *t*(147) = -.179, *p* = .858, BF_{01} = 5.57.

Likewise, an independent sample *t*-test indicated that participants who applied an ego-moving representation to the ambiguous time questions did not report significantly lower inclusion of family and friends in the self as measured by the IOS (*M* = 4.37, *SD* = 1.38) than participants who applied a time-moving representation (*M* = 4.54, *SD* = 4.37), *t*(125) = .702, *p* = .484, BF_{01} = 4.17. Also contrary to expectation, an independent sample *t*-test indicated that participants who chose the ego-moving option on Margolies and Crawford's question did not report significantly lower inclusion of family and friends in the self as measured by the IOS (*M* = 4.54, *SD* = 1.28) than participants who chose the time-moving option (*M* = 4.46, *SD* = 1.27), *t*(147) = -.382, *p* = .703, BF_{01} = 5.29.

Discussion

As was the case in Study 1, Study 2 also did not find a relation between self-concept and the ego- and time-moving representation. The reliability of the two self-concept measures was better than the reliability for the self-concept measures used in Study 1, even though the IOS's reliability was still a bit lower than desired. In spite of the fact that the measures used are suited to measure, and in fact did measure, variation in self-concept amongst a Western population, it might still be that with this Western

population interdependence operates too latent for it to lead to the activation of a time-moving representation over an ego-moving representation. For the next studies we therefore made use of the fact that self-concept can be manipulated experimentally and used an experimental design to test for a relation between self-concept and time representation.

Of interest to note here as well is the fact that participants were quite consistent across the two ambiguous time questions. This is in line with research by Rothe-Wulf et al. (2015) who also found high individual consistency across time scales (hours vs. days) in their participants (US, Sweden, and German). We also found a significant relation between the ambiguous time questions and Margolies and Crawford's question. While Margolies and Crawford (2008) actually also included the ambiguous time question in their research, they did not specifically look at the degree of overlap for the two questions, but did consistently find that valence affects them differently. Where valence does affect whether people choose between the ego- and time-moving option in their question, it does not affect the answers to the ambiguous question. They offer two explanations: (a) the effect of positive valence on time representation might be undermined by that fact that participants would want a positive event to occur earlier and might thus be reluctant to move it *futurewards* (ego-moving), (b) the questions differ conceptually: whereas the ambiguous time question taps into the conceptualization of time, Margolies and Crawford's question might tap into one's conceptualization of an event in space, regardless of time. The later explanation would suggest that their results show a relation between positive affect and approach in space, rather than an association between affect and the construal of time. Our results show quite a large overlap between the two questions and might thus favor the first explanation. This is also corroborated by research which suggests a relation between affect and the construal of time, measured by the ambiguous time questions as well as other measures (Hauser et al., 2009; McGlone & Pfiester, 2009; Richmond et al., 2012).

STUDY 3

As alluded to earlier, for Study 3 we made use of the fact that self-concept can be manipulated experimentally. We investigated whether activating an independent self-concept, in contrast to an interdependent self-concept, makes it more likely for American participants to adopt an ego-moving representation rather than a time-moving representation.

Method

Participants

Participants (N = 141) were recruited via Amazon's Mechanical Turk. We only accepted 'Turkers' who were located in the US and with a 95% or higher approval rate to ensure high quality participants in the sample. Two of the participants (1.42%) were excluded because their mother tongue was not English. Twenty-eight participants (19.86%) were excluded because they failed a screening test that tested whether they carefully read instructions. To avoid any bias, we also excluded two participants (1.42%) who indicated that they were aware of the purpose of the study, specifically the self-concept manipulation and its hypothesized effect on the other measures. A total of 109 participants (60 males and 49 females) with an average age of 33.14 (SD = 9.38) were thus retained for analysis (55 participants in the interdependent condition and 54 in the independent condition). Participants were given monetary compensation in exchange for their participation.

Materials and procedure

Self-concept was manipulated using a Sentence Unscrambling Task (Srull & Wyer, 1979; see Appendix E). This task has been successfully used by many researchers to manipulate self-concept (Briley & Wyer, 2002; Kühnen & Hannover, 2000; Spassova & Lee, 2013; Utz, 2004; van Baaren et al., 2003). Participants were provided with 16 groups of words (e.g., shining – is – the – sun – cup), asked to construct a sentence from each group of words using all but one word, to write out the sentences, and provide the non-used word between brackets (e.g., The sun is shining (cup)). For twelve of the sixteen sentences, the unused word was related to an independent self-concept in the independent condition (e.g., I, autonomous, unique etc.) and to an interdependent self-concept in the interdependent condition (e.g., we, team, similar etc.). The other four sentences contained neutral control words (e.g., color).

Directly after the self-concept manipulation, time representation was gauged similarly as in Study 2 using ambiguous time questions and Margolies and Crawford's question.

We also included the IOS (r = 0.695), also used in Study 1 and Study 2, to ascertain whether participants in the interdependent condition included others more in the self than participants in the independent condition.

Results

Time representation

In regards to the ambiguous time questions, one participant (0.9%) was excluded from the analysis because he/she provided a response not consistent with either the ego-moving or time-moving response. A total of 34 participants (31.2%) gave answers all consistent with a time-moving representation, 60 participants (55%) gave answers all consistent with an ego-moving representation, and 14 participants (12.8%) gave mixed answers. As it is not clear what representation this later group prefers these participants were excluded from the analysis with the ambiguous time questions.

In regards to Margolies and Crawford's question, 36 participants (33%) chose the time-moving option ("The meeting is approaching") whereas 73 participants (67%) chose the ego-moving option ("I am approaching the meeting").

A chi-square analysis revealed that there was no significant association between time representation as gauged by the ambiguous question and time representation gauged by Margolies and Crawford's question, $\chi^2(1) = 1.361$, $p = .256$. A total of 57 participants (61%) were consistent in the representation they applied to the ambiguous time questions and Margolies and Crawford's question (both time-moving or both ego-moving), whereas 37 participants (39%) were not (see Table 2).

TABLE 2. Number of Ego- and Time-Moving Responses to The Ambiguous Time Questions and Margolies and Crawford's Question

Ambiguous Time Question	Margolies and Crawford's Question		Total
	Time-moving	Ego-moving	
Time-moving	13	21	34
Ego-moving	16	44	60
Total	29	65	94

Self-concept & time representation

Contrary to expectation, a chi-square analysis revealed that there was no significant association between the self-concept manipulation and whether participants applied an ego-moving or time-moving representation when answering the ambiguous time questions, $\chi^2(1) = 1.029$, $p = .391$. Bayesian Contingency Tables Tests showed that the BF_{01} was 2.49. Also contrary to expectation, a chi-square analysis revealed that there was no significant association between the self-concept manipulation and

whether participants chose the ego-moving or time-moving option in Margolies and Crawford's question, $\chi^2(1)$ = .559, p = .542 (see Table 3). Bayesian Contingency Tables Tests showed that the BF_{01} was 3.49.

TABLE 3. Number of Ego- and Time-Moving Responses to The Time Representation Questions in The Interdependent and Independent Condition

Condition	Ambiguous Time Question			Margolies and Crawford's Question		
	Time-moving	Ego-moving	Total	Time-moving	Ego-moving	Total
Interdependent	19	27	46	20	35	55
Independent	15	33	48	16	38	54
Total	34	60	94	36	73	109

IOS

An independent sample t-test indicated that participants in the interdependent condition did not report greater inclusion of family and friends in the self as measured by the IOS (M = 4.21, SD = 1.09) than those in the independent condition (M = 4.19, SD = 1.29), $t(107)$ = .064, p = .949.

Discussion

Study 3 did not find that by activating an independent or an interdependent self-concept, participants were more likely to construe time in an ego-moving or time-moving manner respectively. It should be noted here, however, that the self-concept manipulation did not affect the degree to which participants included their friends and family in the self. This is not in line with previous research that did find an effect of self-concept manipulations on measures of independence and interdependence (Aaker & Lee, 2001; Gardner et al., 1999; Kühnen, Hannover, & Schubert, 2001; Lee et al., 2000; Trafimow et al., 1991; Vohs & Heatherton, 2001). More specifically even, Hirata, Kühnen, Hermans, and Lippke (2015), for example, found an effect of their manipulation on the IOS. Importantly, they used a different manipulation (the Similarities and Differences with Friends and Family Task) and were able to include the IOS straight after the manipulation. For Study 4, we have therefore decided to use a different manipulation of self-concept and include a different measure to assess independence/interdependence.

It is of interest to note here as well that Study 3 did not find a significant overlap between Margolies and Crawford's question and the ambiguous time question. This contradicts the findings in the previous study and calls into question whether these two measures tap into the same construct. For Study 5, we have included both measures again to investigate the extent to which both measures overlap.

STUDY 4

Like in Study 3, Study 4 used priming to investigate whether activating an independent self-concept, in contrast to an interdependent self-concept, makes it more likely for American participants to adopt an ego-moving representation rather than a time-moving representation. In Study 4, however, we used a different task to manipulate participant's independent and interdependent self-concept before their time representation was measured.

Method

Participants

Participants (N = 145) were recruited from Amazon's Mechanical Turk. We only accepted 'Turkers' who were located in the US and with a 95% or higher approval rate to ensure high quality participants in the sample. Two participants (1.38%) were excluded because they failed a screening test that tested whether they carefully read instructions. None of the participants indicated awareness of the purpose behind the study, specifically the manipulation, so none were excluded for this reason. A total of 143 participants (73 males and 70 females) with an average age of 36.21 (SD = 12.51) were retained for analysis (73 participants in the interdependent condition and 70 participants in the independent condition). Participants were given monetary compensation in exchange for their participation.

Materials and procedure

Self-concept was manipulated using the Similarities vs. Differences with Family and Friends Task (SDFF; Trafimow et al., 1991). The SDFF is widely used to manipulate self-concept (Brewer & Gardner, 1996; Briley & Wyer, 2002; Ross et al., 2002; Vohs & Heatherton, 2001) with effects that are moderate in size and internally homogenous, as indicated by a meta-analysis on cultural priming (Oyserman & Lee, 2008). In the independent condition, participants were asked to think and write about what makes them different from their family and friends, what they expected themselves to do.

In the interdependent condition, participants were asked to think and write about what makes them similar to their family and friends, what their family and friends expected them to do.

Time representation was gauged using three ambiguous time questions, similar to the ones used in Study 1, 2 and 3. The order of these questions was randomized.

After the time representation measure, participants completed the IOS task, also used in Studies 1, 2, and 3, and a Word Fragment Task (Johnson & Saboe, 2011). The IOS was included to ascertain whether participants in the interdependent condition included others more in the self than participants in the independent condition. The Word Fragment Task was included to ascertain whether participants in the independent condition were more likely to think of words semantically related to independence over interdependence (see Appendix F for details). Participants were asked to fill in 25 word fragments (e.g., "_E", "UNI_ _ _", "_ _ _ _ _ _ENT"). The responses were coded as independent (e.g., "ME", "UNIQUE", "DIFFERENT)", interdependent (e.g., "WE", "UNITED", "DEPENDENT") or neutral (e.g., "BE", "UNICEF", "APARTMENT"), using Johnson and Saboe's (Johnson & Saboe, 2011) examples of target and neutral words. A total of 1455 responses (40.70%) matched the examples given by Johnson and Saboe (2011); the remaining 2129 responses (59.30%) were coded by two independent raters. The raters were in accordance for the majority of responses (93.14%); responses on which the coders disagreed or were unsure about (6.86%) were discussed and resolved. Responses where participants did not follow the instructions and instead gave multiple possibilities were coded as missing (1.1% of total responses). The total number of independent and interdependent responses were summed for each participant. The order of the IOS and Word Fragment Task was randomized.

Results

Time representation

Three participants (2.1%) were excluded from the analysis as they gave a response to the ambiguous time questions not consistent with either an ego-moving or time-moving response. A total of 43 participants (30.1%) gave answers all consistent with a time-moving representation, 67 participants (46.9%) gave answers all consistent with an ego-moving representation, and 30 participants (20.69%) gave mixed answers. As it is not clear what representation this later group prefers these participants were also excluded from the analysis with the ambiguous time questions.

Self-concept and time representation

Contrary to expectation, a chi-square analysis revealed there was no significant association between the self-concept manipulation and whether participants applied an ego-moving or time-moving representation when answering the ambiguous time questions $\chi^2(1) = .188$, $p = .699$ (see Table 4). Bayesian Contingency Tables Tests showed that the BF_{01} was 3.99.

TABLE 4. Number of Ego- and Time-Moving Responses to The Time Representation Question in The Interdependent and Independent Condition

	Ambiguous Time Question		
Condition	Time-moving	Ego-moving	Total
Interdependent	20	34	54
Independent	23	33	56
Total	43	67	110

IOS & Word Fragment Task

An independent sample t-test indicated that participants in the independent condition did not report significantly lower inclusion of family and friends in the self as measured by the IOS ($M = 4.58$, $SD = 1.26$) than participants in the interdependent condition ($M = 4.56$, $SD = 1.28$), $t(141) = .081$, $p = .936$. An independent sample t-test also indicated that participants in the independent condition did not generate significantly more independent words on the Word Fragment Task ($M = 3.94$, $SD = 1.57$) than participants in the interdependent condition ($M = 3.81$, $SD = 1.55$), $t(141) = .516$, $p = .607$. Another independent sample t-test indicated that participants in the interdependent condition did not generate significantly more interdependent words on the Word Fragment Task ($M = 2.97$, $SD = 1.38$) than participants in the independent condition ($M = 2.79$, $SD = 1.49$), $t(141) = -.777$, $p = .439$.

Extra analysis: SDFF check

Because there was no indication that the self-concept manipulation affected the degree to which people included their family and friends in the self as measured by the IOS or that the manipulation affected the number of independent and interdependent words generated in the Word Fragment Task, we wanted to check whether people indeed performed the SDFF task correctly. Each answer was thus checked by two independent raters. For the independent condition, the coders checked whether participants indeed identified a characteristic in which they differed

in some way from others. Participants who (also) identified similarities or who merely mentioned characteristics for which it was not clear that this set them apart from others were excluded. For the interdependent condition, the coders checked whether participants indeed identified something that was shared. Participants who (also) identified differences were excluded. The inter-rater-reliability was excellent based on Cohen's kappa of .900. Entries on which the coders disagreed were discussed and resolved.

By only including those participants who correctly performed the self-concept manipulation, we excluded 6 participants (5.45%) in the independent condition and 13 participants (11.82%) in the interdependent condition. Still, a chi-square analysis revealed that there was no significant association between the self-concept manipulation and whether participants applied an ego-moving or time-moving representation when answering the ambiguous time questions $\chi^2(1) = .019$, $p > .999$ (see Table 5). Bayesian Contingency Tables Tests showed that the BF_{01} was 3.97.

TABLE 5. Number of Ego- and Time-Moving Responses to The Time Representation Question in The Interdependent and Independent Condition

Condition	Ambiguous Time Question		Total
	Time-moving	Ego-moving	
Interdependent	15	26	41
Independent	19	31	50
Total	34	57	91

Discussion

Like in Study 3, Study 4 did not find that activating an independent or an interdependent self-concept makes it more likely for participants to construe time in an ego-moving or time-moving manner respectively. Again, the question arises of whether or not the manipulation did indeed manipulate self-concept as intended as we did not find an effect of the manipulation on the degree to which participants included family and friends in the self nor on the amount of independent or interdependent words they generated in response to a word completion task. The SDFF task has shown to be an effective way to manipulate self-concept though and the content analysis revealed that most participants followed instruction and indeed thought about similarities or differences. When only including those participants who performed correctly on the SDFF task a relation between self-concept and time representation was still not

observed. It is important to realize that both Study 3 and Study 4 were conducted online, which may have influenced any effect of priming. Priming is not only subtle but also malleable suggesting that it might be more suitable to use in a controlled environment (Cesario, 2014; Dijksterhuis, 2013; Loersch & Payne, 2014; see Engeser, Wendland, & Rheinberg, 2006, however, for a succesful online priming manipulation). We therefore tested the relation between self-concept and time manipulation once more in a controlled lab environment.

STUDY 5

For Study 5, we also manipulated self-concept experimentally using priming to investigate whether self-concept is related to the ego- and time-moving representations in an American sample. This time however, the whole experiment was conducted in a controlled lab environment. Again, either participant's independent or interdependent self-concept was activated before their time representation was measured.

Method

Participants

Students from the University of Southern California (N = 145) were recruited through the university's subject pool and participated in this study conducted on the university campus in the lab. Thirty-eight participants (26.21%) were excluded because their mother tongue was not English. Additionally, one participant (0.69%) was excluded because they failed the screening test. To avoid possible bias, we also excluded seven participants (4.83%) who indicated they were aware of what the time questions were supposed to measure. A total of 99 participants (24 males and 75 females) with an average age of 19.95 (SD = 1.32) were retained for analysis (47 participants in the independent condition and 52 in the interdependent condition). Participants were awarded partial course credits in exchange for their participation.

Materials and procedure

The materials and the procedure were identical to the materials and procedure of Study 5 with four modifications. First, participants came to the lab on the university campus to participate in the study. Second, in regard to the SDFF, participants now first had to think for two minutes before writing about what makes them different/ similar to their family and friends. Third, time representation was gauged with an additional measure: on top of the two ambiguous time questions and Margolies and Crawford's question, we also asked participants to write a paragraph about

an event they experienced in the past 90 days (adapted from McGlone & Pfiester, 2009). Participants were asked to describe the event in a single sentence, rate the valence of the event on a 7-point scale (-3 = very unpleasant - +3 = very pleasant), and to write, for 10 minutes, about the event in detail as well as what preceded and succeeded. The paragraphs were analyzed following McGlone and Pfiester's (2009) method. The paragraphs were searched for the 22 common English spatiotemporal words (e.g., *approach*, *pass, start*) identified by McGlone and Pfiester (2009). Each word is of at "least moderate word frequency that appears in linguistic constructions denoting temporal change" and can occur in both human-agent (ego-moving) and event-agent (time-moving) expressions (McGlone & Pfiester, 2009, p. 10). Two independent coders inspected each expression with the spatiotemporal word and identified them as human-agent (e.g., *we passed the deadline on Monday*), event-agent (e.g., *the deadline passed on Monday*) or neither (e.g., *she passed judgment on me*). The inter-rater-reliability was acceptable based on Cohen's kappa of .766. Entries on which the coders disagreed were discussed and resolved (see Appendix G). For each participant, the total number of human-agent and event-agent expressions was summed separately. Fourth, the Word Fragment Task was not included; participants only completed the IOS (r = .481) after the time representation measures.

Results

Time representation

In regards to the ambiguous time questions, three participants (3.03%) gave a response not consistent with either an ego-moving or time-moving representation to one of the questions and were thus excluded from the corresponding analyses. A total of 40 participants (40.4%) gave answers all consistent with a time-moving representation, 45 participants (45.5%) gave answers all consistent with an ego-moving representation, and 11 participants (11.11%) gave mixed answers. As it is not clear what representations this later group prefers these participants were excluded from the analysis with the ambiguous time questions.

In regards to Margolies and Crawford's question, 52 participants (52.5%) chose the time-moving option (*The meeting is approaching*) whereas 47 participants (47.5%) chose the ego-moving option (*I am approaching the meeting*).

A chi-square analysis revealed there was a significant association between time representation as gauged by the ambiguous question and time representation gauged by Margolies and Crawford's question, $\chi^2(1)$ = 9.094, p = .004. A total of 56

participants (65.88%) were consistent in the representation they applied to the ambiguous time questions and Margolies and Crawford's question (both time-moving or both ego-moving), whereas 29 participants (34.11%) were not (see Table 6).

TABLE 6. Number of Ego- and Time-Moving Responses to The Time Representation Questions and Margolies and Crawford's Question

	Margolies and Crawford's Question		
Ambiguous Time Question	Time-moving	Ego-moving	Total
Time-moving	29	11	40
Ego-moving	18	27	45
Total	47	38	85

In regards to the event narratives, 509 expressions were identified using the key terms. The majority of these expressions were not temporal (69.4%); human agent expressions (21.2%) were more frequent than event agent expressions (9.4%).

An independent samples t-test indicated that participants who applied an ego-moving representation to the ambiguous time questions did not significantly use more human-agent expressions in the event narrative (M = 1.35, SD = 1.73) than participants who applied a time-moving representation (M = 0.80, SD = 1.20), t(83) = -1.70, p = .094. An independent samples t-test also indicated that participants who applied a time-moving representation to the ambiguous time questions did not significantly use more event-agent expressions in the event narrative (M = 0.43, SD = .81). An independent samples t-test indicated that participants who chose the ego-moving option in Margolies and Crawford's question did not significantly use more human-agent expressions in the event narrative (M = 1.06, SD = 1.49) than participants who chose the time-moving option (M = 1.11, SD = 1.66), t(97) = .161, p = .872. An independent samples t-test also indicated that participants who chose the time-moving option in Margolies and Crawford's question did not use significantly more event-agent expressions in the event narrative (M = .54, SD = .94) than participants who chose the ego-moving option (M = .43, SD = .68), t(97) = .678, p = .499.

Self-concept and time representation

Contrary to expectation, a chi-square analysis indicated that participants in the independent condition were not significantly more likely to give an ego-moving consistent answer to the ambiguous time questions than participants in the interdependent condition, χ^2(1) = 2.597, p = .131 (see Table 7). Bayesian Contingency

Tables Tests showed that the BF_{01} was 1.06. Also contrary to expectation, a chi-square analysis revealed that participants in the independent condition were not significantly more likely to choose the ego-moving option in Margolies and Crawford's question, $\chi^2(1) = .016$, $p > .999$ (see Table 7). Bayesian Contingency Tables Tests showed that the BF_{01} was 4.03.

Lastly, contrary to expectations, an independent sample t-test also indicated that participants in the independent condition did not generate significantly more human-agent expressions ($M = .91$, $SD = 1.36$) than participants in the interdependent condition ($M = 1.25$, $SD = 1.75$), as measured by the event narratives $t(97) = -1.05$, $p = .294$, $BF_{01} = 2.88$. In contrast, in regards to the event-agent expressions we did find the expected effect: participants in the interdependent condition generated significantly more event-agent expressions ($M = .67$, $SD = .94$) than participants in the independent condition ($M = .28$, $SD = 62$), as measured by the event narratives $t(88.52) = -2.50$, $p = .014$, $BF_{10} = 2.90$. As Levene's Test was significant, $F = 9.66$, $p = .002$, equal variances were not assumed for this t-test.

Self-concept & IOS

Participants in the independent condition did not report greater inclusion of family and friends in the self as measured by the IOS ($M = 5.35$, $SD = 1.16$) than participants in the interdependent condition ($M = 5.13$, $SD = 1.17$), $t(97) = .967$, $p = .336$.

TABLE 7. Number of Ego- and Time-Moving Responses to The Time Representation Questions in the Interdependent and Independent Condition

Condition	Ambiguous Time Question			Margolies and Crawford's Question		
	Time-moving	Ego-moving	Total	Time-moving	Ego-moving	Total
Interdependent	17	27	44	27	25	52
Independent	23	18	41	25	22	47
Total	40	45	85	52	47	99

Extra analysis: SDFF check

Because in this study, like in Study 4, the IOS again did not indicate that the manipulation affected whether people included others in their self-concept, we wanted to verify whether people indeed followed instructions and indeed thought about how they were similar to close others in the interdependent condition and

different in the independent condition. Each generated response in the SDFF task was thus checked by two independent raters in the same way as in Study 4. The inter-rater-reliability was acceptable based on Cohen's kappa of .750.

By only including those participants who correctly performed the self-concept manipulation we excluded 6 participants (6.06%) in the independent condition and 14 participants (14.14%) in the interdependent condition. Still, a chi-square analysis revealed that there was no significant association between the self-concept manipulation and whether participants applied an ego-moving or time-moving representation when answering the ambiguous time questions, $\chi^2(1)$ = 2.699, p = .141 (see Table 8). Bayesian Contingency Tables Tests showed that the BF_{10} was 1.11. Another chi-square analysis similarly revealed that there was no significant association between the self-concept manipulation and whether participants selected the ego-moving or time-moving option in Margolies and Crawford's question, $\chi^2(1)$ = .294, p = .655 (see Table 8). Bayesian Contingency Tables Tests showed that the BF_{01} was 3.15.

An independent sample t-test also indicated that participants in the independent condition did not generate significantly more human-agent expressions (M = 0.76, SD = 1.16) than participants in the interdependent condition (M = 1.11, SD = 1.54), as measured by the event narratives $t(77)$ = -1.145, p = .256, BF_{01} = 2.42. Lastly, an independent sample t-test indicated that participants in the interdependent condition did not generate significantly more event-agent expressions (M = 0.68, SD = .96) than participants in the independent condition (M = .32, SD = .65), as measured by the event narratives $t(64.281)$ = -1.973, p = .053, BF_{10} = 1.30.

TABLE 8. Number of Ego- and Time-Moving Responses to The Time Representation Questions in the Interdependent and Independent Condition - Only With Participants Who Followed SDFF Instructions Correctly

Condition	Ambiguous Time Question			Margolies and Crawford's Question		
	Time-moving	Ego-moving	Total	Time-moving	Ego-moving	Total
Interdependent	11	20	31	19	19	38
Independent	20	16	36	23	18	41
Total	31	36	67	42	37	79

Extra analysis: Event narratives

During the coding of the event narratives, it came to our attention that a large portion of the participants who used human-agent or event-agent expressions (29.41%) used both types in their narratives. This, together with the fact that we found contradictory results – no effect of self-concept on human-agent expression but an effect of self-concept on event-agent expressions – made us reconsider whether using the sum of human-agent and event-agent expressions was the best measure to use. Perhaps the effect of the manipulation was only short lived. To test this, we performed an additional analysis in which we only took into consideration whether participants used a human-agent or event-agent expression first. A chi-square analysis confirmed, however, that contrary to expectations, participants in the independent condition were not significantly more likely to use a human-agent expression first compared to an event-agent expression, $\chi^2(1) = .451$, $p = .608$ (Table 9), $BF_{01} = 2.62$.

TABLE 9. Number of Participants Who Used a Human-Agent or Event-Agent Expression First By Condition

Condition	Event-agent	Human-agent	Total
Interdependent	14	23	37
Independent	9	21	30
Total	23	44	67

Discussion

Overall, Study 5 confirms the findings of Study 3 and Study 4 that activating an independent or an interdependent self-concept does not trigger an ego-moving or time-moving representation respectively. Initially, we did, however, find a significant effect of the self-concept manipulation on the number of event-agent expressions that participants used in their narratives. Considering however that an analogous effect was not found for the human-agent expression combined with the fact that the effect did not reach significance when only considering those participants who demonstrated that they had correctly followed the instructions of the manipulation, it might be that this is just a spurious effect. Additionally, the event narratives did not show overlap with the ambiguous time questions and Margolies and Crawford's question suggesting that they do not tap into time representation as gauged by these measures. Perhaps the event narratives distinguish more between whether you feel you control events or whether the events control you rather than distinguishing between the conceptualization of your moving through time vs. the events moving

through time. Future research might address this by further exploring the overlap between the measures. This would not only give us insight into the construct validity of these measures but also build upon the research that shows a relation between time representation and agency (McGlone & Pfiester, 2009; Richmond et al., 2012). If indeed the event narratives gauge differences in control and/or causal attribution one would expect that an interdependent self-concept is related to the generation of more event agent expressions as previous research has already established a link between an interdependent self-concept and external causal attribution (Kühnen et al., 2013; Miyamoto & Kitayama, 2002).

Even though this study was conducted in a controlled lab environment here again, the manipulation did not carry-over to affect the degree to which participants included family and friends in the self. This calls into question how exactly the manipulation affected self-concept. It should be noted here though that the self-concept measure (the IOS) was only included after the time measures were administered, which were somewhat lengthy. Possibly carry-over effects of the manipulation on the IOS might have therefore been dampened. Moreover, content analysis showed that participants, overall, did follow instructions and even when only including those who listed either differences or similarities there was no significant effect of the self-concept manipulation on time representation. The absence of the relation between self-concept and time-representation seems therefore more likely than the idea that the manipulation, well-used and shown to be effective in a meta-analysis (Oyserman & Lee, 2008), did not manipulate self-concept as intended.

STUDY 6

For Study 6, we made use of the fact that, similar to self-concept, time representations can be manipulated experimentally. We investigated, in an American sample, whether activating an ego-moving representation, in contrast to a time-moving representation, leads to the activation of an independent self-concept instead of an interdependent self-concept. Due to the subtle nature of the time representation manipulation, consistent with Study 5, Study 6 was conducted in a controlled lab environment.

Method

Participants

Students from the University of Southern California (*N* = 103) were recruited through the university's subject pool and participated in this study conducted on the university

campus in the lab. Twenty-seven participants (26.2%) were excluded because their mother tongue was not English. One participant (0.97%) was excluded because he/she failed the screening test. A total of 75 participants (29 males and 46 females) with an average age of 20.28 (*SD* = 1.82) were retained for analysis (37 participants in the ego-moving condition and 38 participants in the time-moving condition). Participants were awarded partial course credits in exchange for their participation.

Materials and procedure

To manipulate time representation, we developed a task in which participants were asked to answer temporal questions phrased either in an ego-moving or a time-moving way and then watched ego-moving or time-moving animations. The idea for the task is based on the scheduling task by Hauser et al. (2009). Participants completed a total of 12 trials. Each trial told participants what day of the week it supposedly was and told them about a fictive event taking place in 1, 2 or 3 days. They were asked in an open-ended format on what day the event would be. Sentences were formulated using either an ego-moving representation (e.g., *Today is Wednesday. We will pass the deadline in two days. On what day is the deadline?*) or a time-moving representation (e.g., *Today is Wednesday. The deadline will pass us in two day. On what day is the deadline?*). After participants filled in an answer, they were informed whether they were correct or not and were shown an animation. In the ego-moving condition, the animation showed a person moving on a timeline; the timeline was much like a road with the days of the week written on them. In the time-moving condition, the animation showed the same person and timeline, but now the person was stationary and the timeline was moving. The animation showed the passing of time presented in the question (e.g., from Wednesday to Friday). The ego-moving or time-moving expressions were repeated together with the feedback (e.g., *Correct! If today is Wednesday and we will pass the deadline in two days, the deadline is on Friday*). Preceding the 12 trials, participants completed a practice trial and received instructions. As part of the instructions they were told that the researchers wanted to get a better understanding of how people make temporal judgments and that we know from previous research that people often visualize time using space. In the ego-moving condition they were then told that often people imagine themselves moving along a timeline whereas in the time-moving condition they were told that people often imagine a timeline moving. A brief animation, showing either a person 'walking' from Thursday to Friday or a moving timeline moving by a person from Wednesday to Friday, accompanied the instructions.

Self-concept was gauged using four different measures. First, participants completed the Twenty Statements Test (TST; Gardner et al., 1999; Kuhn & McPartland, 1954;

Mandel, 2003). This measure asks participants to provide twenty self-descriptions. Two independent rater coded responses; responses describing an idiocentric personality characteristic (e.g., *I am smart* or *I am tall*) where coded as independent, responses describing a relational role (e.g., *I am a sister)* or a membership of a social group (e.g., *I am a Trojan)* where coded as interdependent (Gardner et al., 1999). Responses describing an allocentric personality characteristic (e.g., *I am sensitive to others*) as well as entries that did not provide a self-description were put in a separate category (Watkins, Yau, Dahlin, & Wondimu, 1997). The inter-rater-reliability was good based on Cohen's kappa of .847. Entries on which the coders disagreed were discussed and resolved. Second, participants completed the IOS (*r* = .181) that was also used in Study 1, 2, 3, 4, and 5. As the IOS had unacceptably low reliability in Study 6, we decided not to analyze the data collected with this measure as part of Study 6. Third, participants completed Oyserman's questionnaire (independent scale: α = .653; interdependent scale α = .764) that was also used in Study 1. Fourth, participants completed the RISC questionnaire (α = .760) that was also used in Study 2.

After participants completed the self-concept measure, they were asked two ambiguous time questions and Margolies and Crawford question, also used in Study 2, 3, and 5, to gauge their time representation.

Results

Time representation and self-concept

Contrary to expectation, an independent sample *t*-test indicated that participants in the ego-moving condition did not generate significantly more independent self-descriptions (*M* = 13.03, *SD* = 3.75) than participants in the time-moving condition (*M* = 11.55, *SD* = 3.80), as measured by the TST, $t(73)$ = 1.69, *p* = .095, BF_{01} = 1.23. Similarly, participants in the time-moving condition did not generate significantly more interdependent self-descriptions (*M* = 2.32 *SD* = 2.68) than participants in the ego-moving condition (*M* = 2.31, *SD* = 2.29), as measured by the TST, $t(73)$ = .015, *p* = .988, BF_{01} = 4.19.

Similarly, participants in the ego-moving condition did not score significantly higher on independence as measured by Oyserman's questionnaire (*M* = 3.81, *SD* = .47) than participants who applied a time-moving representation (*M* = 3.84, *SD* = .36), $t(73)$ = -.347, *p* = .730, BF_{01} = 3.97. Analogously, participants in the time-moving condition did not score significantly higher on interdependence as measured by Oyserman's questionnaire (*M* = 3.33, *SD* = .61) than participants who applied a time-moving representation (*M* = 3.31, *SD* = .55), $t(73)$ = -.187, *p* = .852, BF_{01} = 4.12.

Finally, participants in the time-moving condition did not score higher on interdependence as measured by the RISC (M = 5.27, SD = .79) than participants in the time-moving condition (M = 5.46, SD = .57), t(73) = 1.215, p = .228, BF_{01} = 2.22.

Time manipulation and time questions

Two participants (2.67%) were excluded from the analyses involving the ambiguous time questions because they provided an answer other than Monday or Friday to the ambiguous Wednesday question. An additional seven participants (9.33%) were excluded from the analyses because they did not apply the same representation to both ambiguous time questions. A chi-square analysis revealed that participants in the ego-moving condition were not significantly more likely to apply an ego-moving representation to the ambiguous time questions χ^2(1) = .186, p = .433 (see Table 10). Another chi-square analysis on Margolies and Crawford's question revealed that participants in the ego-moving condition were not significantly more likely to choose the ego-moving option compared to the time-moving option, χ^2(1) = 3.845, p = .065 (see Table 10).

TABLE 10. Number of Ego- and Time-Moving Responses to The Time Representation Questions in The Ego- and Time-Moving Condition

Condition	Ambiguous Time Question			Margolies and Crawford's Question		
	Time-moving	Ego-moving	Total	Time-moving	Ego-moving	Total
Time-moving	10	24	34	25	13	38
Ego-moving	11	21	32	16	21	37
Total	21	45	66	41	34	75

Discussion

Study 6 did not find proof for the idea that spatializing time in either the ego-moving manner or time-moving manner leads to higher levels of independence or interdependent respectively. The study used a wide range of measures to tap into self-concept, using both implicit (TST) as well as explicit (IOS, Oyserman's questionnaire, and the RISC questionnaire) measures. We excluded the IOS from the analyses because of its low reliability. This measure also had a low reliability in Study 1. Even though it should be noted that reliability is difficult to assess for a two-measure item it nevertheless suggests that the degree to which people included family in the self did not necessarily match with the degree to which they included friends. As Study 1

also used a student population, one might be inclined to think that this explained it in part, however Study 5's sample was drawn from exactly the same student population as Study 6 and there reliability was not as low. Future research intended to use the IOS should therefore carefully consider which items to include for which samples.

To manipulate time representation we built upon the task used by Hauser et al. (2009) and Richmond et al. (2012) and extended it by accompanying the ego- and time-moving expressions by showing animations which depicted either one of the representations. Both Hauser et al. (2009) and Richmond et al. (2012) did not check whether their manipulation had an effect on either the ambiguous time question or Margolies and Crawford's question. We did include these after the self-concept measures but did not find an effect of the manipulation. Even though the self-concept measures were quite lengthy and the effects of the manipulation might be somewhat short-lived, it does cast uncertainty on what the manipulation exactly did. Future research should look into this and possibly consider other ways to manipulate time representation as effects in this direction, from time representation to other psychological variables, are not only interesting from a theoretical point of view but also for applied purposes.

4

GENERAL DISCUSSION

The present research investigated whether self-concept was related to time representation, specifically whether an independent self-concept was related to an ego-moving representation and an interdependent self-concept to a time-moving representation. Across several experiments, we did not find support for such a relation. Specifically, we found no indication that the two constructs are related in Dutch or American participants. Also, the results did not offer any indication that inducing an independent or interdependent self-concept activates an ego-moving or time-moving representation respectively, nor did we find that activating an ego-moving or time-moving representation leads to the activation of an independent or interdependent self-concept respectively. Below the findings are discussed in the context of previous research as well as the issues and questions this research brought to the fore.

Cultural Variation in Time Representation Revisited

As we did not find a relation between self-concept and time representation, it becomes unlikely that cultural differences related to self-concept underlie cultural differences related to the proclivity for the ego-moving or time-moving representation. This is surprising when considering the general pattern outlined in the Introduction where

individualistic countries, with an independent self-concept, preferred, or frequently used, the ego-moving representation, and where collectivistic countries, with an interdependent self-concept, preferred the time-moving representation. On the other hand, as was mentioned earlier, Germans and Swedes, who are quite similar in terms of self-concept, have different preferences when it comes to using the ego-moving or time-moving representation. Similarly, research in the domain of space by Majid et al. (2004) showed that cultural groups who were comparable in terms of individualism and collectivism, had quite different ways of talking and thinking about the location of objects. Other cultural factors besides self-concept might thus need to be considered.

Research already gives some indication for what these other factors behind the cultural variation in time representations might be. Research by Lai and Boroditsky (2013) convincingly showed that differences related to usage frequencies of the ego- and time-moving representations in Mandarin and English could explain the preference for the ego- and time-moving representations in Mandarin and English speakers. Similarly, Gaby (2012) compellingly showed that the different ways of thinking about time in the two populations of ethnic Thaayorre from Pormpuraaw was due to the different ways of talking about space in their respective language (Kuuk Thaayorre and English), even though the Kuuk Thaayorre speakers do not talk about time like they talk about space. In contrast, Bender, Rothe-Wulf, Huther, and Beller's (2012) data, involving four different cultural groups, did not show that preferences in terms of spatial frames of reference overlap with the time representations of these groups. Future research will thus need to explore whether there are differences related to usage frequency of time representations in other languages besides English and Mandarin, whether that can explain the proclivity for the ego-moving or time-moving representation, and explore whether the differences in talking about space can also be ruled out as explanation for variation in the proclivity for the ego- and time-moving representations for other cultural groups than the ones considered by Bender et al. (2012).

Besides language as a likely candidate when trying to explain cultural variation in time representations, corroborated by numerous studies both in and outside of the domain of time all showing an effect of language on cognition (Boroditsky, 2001; Boroditsky et al., 2011; Fausey & Boroditsky, 2010; Guiora, Beit-Hallahmi, Fried, & Yoder, 1982; Lucy, 1996), several studies point towards other cultural factors as well. Namely, de la Fuente et al. (2014), found that speakers of Darija place the future to the back of the body and the past to the front, even though they talk about the future as being in front of the body and the past to the back of the body. Their research indicates that temporal focus - whether more importance is attributed to the past or future –affects this: a past-focus

coincides with the past being placed to the front and the future to the back whereas a future focus coincides with the past being placed to the back and the future to the front. Moreover, another body of research identifies writing direction as another source for variation in time representation: writing direction influences whether time is conceptualized as flowing from left to right or from right to left (Fuhrman & Boroditsky, 2010; Santiago et al., 2007; Santiago, Román, Ouellet, Rodríguez, & Pérez-Azor, 2010; Tversky et al., 1991). Both temporal focus and writing direction have not been looked at in relation to the ego- and time-moving representations and future research should carefully consider whether from a conceptual viewpoint these and similar cultural factors might be likely candidates for explaining cultural variation in the proclivity for the ego- and time-moving representations.

Conceptual Overlap Between Self-Concept and Time Representations Revisited

The fact that we did not find proof for a relation between self-concept and time representation goes against the conceptual link corroborated by research which links differences in agency to differences in both self-concept and time representation. Previous research indicates that an independent self-concept, found in individualistic cultures, places emphasis on personal agency and dispositional attributions (Kühnen et al., 2013; Menon et al., 1999; Miyamoto & Kitayama, 2002; Morris & Peng, 1994). Similarly, an ego-moving representation seems to coincide with personal agency (Duffy & Feist, 2014; Richmond et al., 2012). These lines of research have used slightly different measures though reflecting a different conceptualization of the construct: where the research focusing on self-concept has used causal attribution tasks and content coding of newspapers (Kühnen et al., 2013; Menon et al., 1999; Morris & Peng, 1994), the research focusing on time representation has used the Behavioral Identification Form (Richmond et al., 2012) and looked at lifestyle (Duffy & Feist, 2014). It would therefore be interesting for future research to test more directly whether an independent self-concept is actually related to personal agency, as measured by, for example, the Behavioral Identification Form, and whether time representations are related to causal attribution. This would shed more light on why self-concept and time representation are not related, inform us more generally about whether, and how, agency and self-concept are interconnected within the same cultural mindset (individualism and collectivism) and inform us about the psychological processes associated with different spatial representations of time.

The fact that we did not find proof for a relation between self-concept and time representation also goes against the conceptual link corroborated by research which links differences in temporal proximity to differences in both self-concept and time

representation. Previous research indicates that an independent self-concept is related to seeing future events as more distant, further into the future, whereas an interdependent self-concept is related to seeing future events as more proximate, closer to the present (Lee et al., 2011; Spassova & Lee, 2013). Similarly, the ego-moving representation is linked to futurewards movement and behavior associated with moving actions/events further into the future (i.e., procrastination) where the time-moving representation is linked to pastwards movement and behavior associated with moving future actions/events into the present (i.e., conscientiousness; Duffy & Feist, 2014; Duffy et al., 2014; Rothe-Wulf et al., 2015). Conscientiousness, in turn, has to do with getting things done in time and is related to a future orientation (Harber, Zimbardo, & Boyd, 2003; Prenda & Lachman, 2001; Zimbardo & Boyd, 2008). Contrary to what would be expected, a future orientation is not related to a time-moving representation but rather found to be associated with an ego-moving representation (Richmond et al., 2012). Additionally, research by Maddux and Yuki (2006) found that an interdependent self-concept is related to a greater awareness of distal consequences compared to only proximate, direct consequences. Future research will thus need to solve these somewhat contradictorily results and shed light on how time representation is exactly related to a future orientation and conscientiousness and how exactly self-concept is related to temporal perceptions of events and consequences.

Methodological Issues and Insights

Even though we did not find a relation between self-concept and time representation, our research highlights some noteworthy (methodological) issues. One of these issues concerns the fact that in the studies where we manipulated self-concept (Study 3, Study 4, and Study 5), we generally did not observe a spillover effect on measures like the IOS and WFT which were included after the time representation. Even though the manipulations we used are well established and tested in previous research it does raise some questions. For example, why did the manipulations not affect these measures? Do these manipulations affect a different aspect of self-concept than is gauged by the IOS and WFT? Or did the manipulations maybe only affect self-concept for a short period of time? Although we cannot move beyond speculation at this point, it does align with some of the more general issues that have surrounded priming studies in the field lately and highlight the need for careful pretesting, replication, and more precise insight into the mechanism underlying (cultural) priming (Molden, 2014; see Oyserman, 2011, 2015, for a theoretical discussion on cultural priming).

Secondly, the use of several operationalizations of time representation within the same studies allows for comparison of these measures. We did not only include different versions of the ambiguous time question – and found, like other research

(Núñez, Motz, & Teuscher, 2006; Richmond et al., 2012; Rothe-Wulf et al., 2015), that people are consistent in which representation they apply across scales (days, hours etc.) – but we also included Margolies and Crawford's question, an adaptation from the event narrative task by McGlone and Pfiester (2009), and a manipulation of time representation by adapting the scheduling task of Hauser et al. (2009; also used by Richmond et al., 2012). In the three studies (Study 2, 3, and 5) where we looked at the relation between the ambiguous time questions and Margolies and Crawford's question almost two thirds of the participants were consistent in the representation that they applied, only in two studies was this relation significant however. This suggests that the two questions measure related, but different constructs. Margolies and Crawford (2008) argue this as well as they find that valence effects whether people choose the ego-moving or time-moving option to their question but not the answer they provide in response to the ambiguous time question. As for the event narrative task and the time representation manipulation, as noted before, we also did not find proof for overlap with the ambiguous time question or Margolies and Crawford's question. In case of the event narratives, this might be due to conceptual differences between human- and event-agent expressions and the ego- and time-moving representations as well as the specifics regarding the way we used the task and coded the answers. Nevertheless, further research will need to clarify how these different measures of time representation relate to one another and, more in general, how these (cognitive) representations of time translate to answers generated in response to linguistically ambiguous sentences and the way events are spontaneously narrated.

The need for additional insight into gauging time representations is highlighted by the fact that the ambiguous time questions, the measure used almost exclusively to link time representations to psychological constructs such as personality traits (Duffy & Feist, 2014), valence, (inferences about) emotions (Hauser et al., 2009; Lee & Ji, 2014; McGlone & Pfiester, 2009; Richmond et al., 2012; Ruscher, 2011), and behavior (Duffy et al., 2014), are limited in some respects. Namely, conceptual research on time representation has identified additional representations of time to the ego- and time-moving representations. Research by Nuñez et al. (2006), for example, on Americans, shows that people can also think about time moving irrespective of the ego. This is conceptually very different from an ego-moving representation even though both will generate a *pastwards* answer to the ambiguous time question. What further complicates things though is that the way researchers have described and catalogued time representations is heterogeneous with a paucity of consensus not only in theoretical approach but also in terms of methodology. Bender and Beller (2014) have successfully started to remedy this by integrating and systemizing approaches using spatial frames of reference but an integration of insights gained

from such reviews into the research and methods of researchers working on linking time representations to the psychological construct mentioned above remains to be realized.

CONCLUDING REMARKS

The data from the six studies presented here suggests that self-concept and time representations are not related. Nevertheless, we hope this work provides a useful impetus for future work in this area. Our research has integrated research on cross-cultural variation in time representation with research that links the ego- and time-moving representations to a range of psychological constructs. We hope that it therefore serves as an inspiration to continue to explore possible links between these two lines of research. This would not only give us more insight into why cultures represent time differently but also what the consequences of this difference are and whether the relation between the time representations and certain psychological constructs are universal.

APPENDIX A

Oyserman's Questionnaire

Adapted from Oyserman (1993). The instructions given to participants read as follows: In the next part you will read through 22 statements. Please indicate the extent to which you agree or disagree with each of the statements (1 = strongly disagree, 5 = strongly agree).

The 11 independent statements:

1. My personal attributes are what make me who I am.
2. I am unique, different from everyone else.
3. I enjoy being unique and different from others in many respects.
4. It is important for me to be myself.
5. To know who I really am, you must examine my achievements and accomplishments.
6. A mark of character is a focus on achieving personal goals.
7. It is better for me to follow my own ideas than to take suggestions from my family.
8. My personal happiness is more important to me than almost anything else.
9. Individual happiness and the freedom to attain it are central to who I am.
10. If I make my own choices I will be more happy than if I listen to others.
11. Challenging myself, achieving all that I can is important to me.

The 11 interdependent statements:

1. If you know the groups I belong to, you'll know who I really am.
2. Whenever my family needs something I try to help.
3. To know who I really am, you must see me with members of my group.
4. My relationships with others are a very important part of who I am.
5. The history and heritage of my religious, national or ethnic group are a large part of who I am.
6. A person of character helps his/her religious, national-ethnic group before all else.
7. My satisfaction depends on the well-being of those who are close to me.
8. I have respect for American leaders.[1]
9. It is important to me to think of my self as a member of my religious, national or ethnic group.

___
[1] Adapted to match with American sample. Original questionnaire is about Jewish leaders/people.

10. For me, personal goals are very similar to family goals.
11. For me, self-actualizing really means doing something meaningful for the American people.[2]

APPENDIX B

Time Representation Questions

The ambiguous Wednesday question:

Next week Wednesday's meeting has been moved forward two days. What day is the meeting now that it has been rescheduled?

The ambiguous 12 o'clock question:

Tomorrow's 12:00 o'clock meeting has been moved forward two hours. What time is the meeting now that it has been rescheduled?

The ambiguous alarm clock question:

Normally an alarm clock is set for 9 am but the alarm has been set 10 minutes forward. What time is the new alarm set for?

Margolies and Crawford's question:

Imagine an event is due in a few weeks. Which statement best expresses how you feel?

The event is approaching.

We are approaching the event.

---

[2] Adapted to match with American sample. Original questionnaire is about Jewish leaders/people.

APPENDIX C

Screening Test

Participants were presented with the following statement. If they left the answer box empty instead of typing "none" we had no indication that they read and followed instructions carefully so did not include their data for analysis:

If you have any final questions/comments or remarks you can leave them below. If you have none please type "none".

APPENDIX D

Relational-Interdependent Self-Concept Scale

Taken from Cross, Bacon, and Morris (2000). The instructions given to participants read as follows:
In this part you will be presented with 11 statements. Please indicate the extent to which you agree or disagree with each of these statements (1 = strongly disagree, 7 = strongly agree).

The statements (item 8 and 9 were reverse coded for the average):

1. My close relationships are an important reflection of who I am.
2. When I feel very close to someone, it often feels to me like that person is an important part of who I am.
3. I usually feel a strong sense of pride when someone close to me has an important accomplishment.
4. I think one of the most important parts of who I am can be captured by looking at my close friends and understanding who they are.
5. When I think of myself, I often think of my close friends or family also.
6. If a person hurts someone close to me, I feel personally hurt as well.
7. In general, my close relationships are an important part of my self-image.
8. Overall, my close relationships have very little to do with how I feel about myself.
9. My close relationships are unimportant to my sense of what kind of person I am.
10. My sense of pride comes from knowing who I have as close friends.
11. When I establish a close friendship with someone, I usually develop a strong sense of identification with that person.

APPENDIX E

Sentence Unscrambling Task

The instructions given to participants read as follows:

In this first part you will be presented with a group of words each time. Your task is to use as many of these words as possible, making a correct sentence. Write the sentence in the space provided below. Please put all the words you did not use between brackets.

Below you will find an example:

shining - is - the - sun - cup

With these groups of words you can make a sentence using the words shining, is, the, and sun. You cannot use the word cup. So your answer would be:

The sun is shining (cup)

The independent sentences:

coffee - I - ready - is – the
green - me - the - is - grass
Jean - mine - was - in - for - time - train - the
Pete - color - eats - apple – an
bear - the - eats - independent – honey
shop - closed - distinct - is – the
capital - is - the - Brasilia - different - of – Brazil
grandma - competitive - sleeping – is
have - the - children - sweets – door
the - guitar - unique - plays – boy
is - raining - autonomous - it – today
question - she - individual - a – has
separate - water - ice - turned - the – into
is - orange - the - he - newspaper – reading
from - glass - the - the - table - single – fell
early - to - wakes - she - run – napkin

The interdependent sentences:

coffee - we - ready - is – the
green - us - the - is – grass
Jean - shared - was - in - for - time - train - the
Pete - color - eats - apple – an
bear - the - eats - dependent – honey
shop - closed - collective - is – the
capital - is - the - Brasilia - similar - of – Brazil
grandma - same - sleeping – is
have - the - children - sweets – door
the - guitar - solidarity - plays – bos
is - raining - team - it – today
question - she - others - a – has
equal - water - ice - turned - the – into
is - orange - the - he - newspaper – reading
from - glass - the - the - table - inclusion – fell
early - to - wakes - she - run – napkin

APPENDIX F

Word Fragment Task

The instructions given to participants read as follows:
In this part of the survey you will be asked to complete 25 letter combinations. For example, a word fragment is presented like this: _ _ E E. You will be asked to complete the fragment with the first word that comes into mind, for example T R E E or F L E E. Please be ensured that there are no wrong or right answers.

The 25 letter combinations.:

_ E
_ _ _ SONAL
S H _ _ E
S _ _ F
O _ _
_ _ _ _ _ _ E N T
G R _ _ _
_ _ _ G L E
M E M _ _ _

```
I N D _ _ _ _ _ _ _
_ A M E
D U _ _
M A _ _
L _ N E
C O M P _ _ _
_ _ _ L I T Y
_ E A M
_ I N E
_ _ M _ O N
U N I _ _ _
P R I _ _ _ _
_ _ N C H
S _ _ _ L
C _ _ W
S O _ _
```

Johnson & Saboe's (2011) example words, coded as indicated:

Independent: ME, PERSONAL, SELF, OWN, DIFFERENT, SINGLE, INDIVIDUAL, DUEL, LONE, COMPETE, ABILITY, MINE, UNIQUE, PRIVATE, SKILL, SOLO

Interdependent: WE, SHARE, OUR, DEPENDENT, GROUP, MEMBER, SAME, DUTY, MATE, COMPANY, TEAM, COMMON, UNITED, BUNCH, CREW

Neutral: BE, SEASONAL, SHORE, SURF, OUT, PRESIDENT, GRAIN, GOOGLE, MEMORY, INDEFINITE, CAME, DULL, MAKE, LANE, COMPUTE, UTILITY, BEAM, DINE, SUMMON, UNIPED, PRIMATE, LUNCH, SHELL, CROW, SOLD

APPENDIX G

Event Paragraph

The instructions given to participants read as follows:
For this part we want you to think about an event that happened in your life. It doesn't matter which event you pick as long as it occurred not longer than 90 days ago. On the following pages we will ask you a couple of questions regarding this event. Proceed to these questions as soon as you have picked an event.

First question:

Please describe the event below using a brief, one sentence or less description.

Second question (7-point scale, -3 = very unpleasant, 0 = neither pleasant nor unpleasant, +3 = very pleasant):

How pleasant was the event?

Third question:

Please write a narrative about the event. Describe the event in the space below as well as the events immediately preceding and following it. Try to be as detailed as possible. Try to spend at least 5 minutes writing if not longer. The page will auto-advance after 10 minutes.

Key terms as identified by McGlone & Pfiester (2009):

ahead, approach, arrive, begin, behind, close, come, done, end, enter, finish, forward, from....to/until, go, move, near, pass, reach, run, and start.

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