Time Travels: The Spatial Representation of Time Across Cultures and Languages

Loermans, A.C.

2018

document version
Publisher's PDF, also known as Version of record

Link to publication in VU Research Portal

CHAPTER 2

Different Times: The Culture-as-Situated-Cognition Approach and Cultural Variation in Spatializations of Time

—————————————

Based on:

ABSTRACT

Across the globe, the concrete domain of space is used to represent the abstract domain of time. There is, however, extensive variation across cultures in the precise way that space is used to represent time. Research in this area, consequently, offers insight into the influence of culture on cognition and behavior. Nonetheless, theorizing within cultural psychology typically does not include this research but tends to focus on variation associated with the individualism-collectivism dimension. In this paper, we address this lacuna by integrating research on cultural variation in time representation with the culture-as-situated-cognition (CSC) approach, a recognized theory within cultural psychology. In doing so, we provide a test of the three levels of culture as outlined by the CSC approach outside the traditional individualism-collectivism literature and also generate novel research ideas for researchers working with the CSC approach and/or on cultural variation in time representation.

Keywords: time; culture; space-time mappings; situated cognition; embodiment

INTRODUCTION

Across the world's cultures, the domain of space is used to talk and think about time. Linguists have long observed and documented this across many languages (Boroditsky & Gaby, 2010). In English, for example, we can observe the link between space and time in expressions such as *the deadline is approaching* and *looking forward to tomorrow*. Similar sorts of expressions can be found in most other languages as well, including languages dissimilar to English such as Chinese (Boroditsky, 2001; Boroditsky et al., 2011; Lai & Boroditsky, 2013; Yu, 1998), Japanese (Moore, 2011), Aymara (Moore, 2011; Núñez & Sweetser, 2006), and Wolof (Moore, 2011). Empirical studies in developmental psychology show that, in children, spatial terms precede the use of their temporal counterparts, whereas the temporal counterparts are more prevalent in adult speech (Casasanto, Fotakopoulou, & Boroditsky, 2010; Clark, 1973). Moreover, experiments not involving linguistic stimuli or responses have shown that people construct mental representations of time in terms of space, thereby further convincingly attesting to a conceptual link between space and time, in addition to a linguistic one (Casasanto & Boroditsky, 2008). Besides, physical movement through space (actual or imagined) influences one's conception of time (Boroditsky & Ramscar, 2002; Matlock et al., 2005; Miles et al., 2010).

Although many cultures rely on the concrete domain of space to represent the abstract concept of time, significant cultural variation exists in the precise way that time is spatialized (Bender & Beller, 2014). For instance, representing the future to the front of the ego (e.g., *having a bright future ahead*) and the past to the back (e.g., *leaving the past behind*) (Lakoff & Johnson, 1980), has turned out not to be universal across cultures: the Aymara and Darijia represent the future to the back of the ego and the past to the front of the ego (de la Fuente et al., 2014; Núñez & Sweetser, 2006). Consequently, much of the (cultural) research on the representation of time has been devoted to pinpointing the precise mechanisms through which culture shapes cognition (about the representation of time). Research on the representation of time is not unique in highlighting the moderating role of culture though; rather it is paralleled by a larger trend within psychology wherein certain psychological phenomena and processes, previously assumed to be generalizable across cultures, are increasingly being recognized as being culturally specific (Henrich, Heine, & Norenzayan, 2010; Schweder, 1991). This trend, in turn, served as major impetus for cultural psychology as a field.

One well-established theory within cultural psychology is the culture-as-situated-cognition (CSC) approach (Oyserman, 2011, 2015, 2017; Oyserman, Novin, Flinkenflögel, & Krabbendam, 2014). The CSC approach outlines how (and why) culture shapes

cognition. Specifically, it has focused on how the individualistic and collectivistic dimension – (one of) the main perennial foci of cultural psychology – shapes cognition (Hofstede, 1980; Kühnen, Hannover, Roeder, et al., 2001; Markus & Kitayama, 1991; Morris & Peng, 1994; Oyserman, 2011, 2015, 2017; Oyserman et al., 2014; Triandis, McCusker, & Hui, 1990), whilst also being an impetus for new studies. For example, studies have started to explore, more explicitly, the situated and dynamic character of culture by using priming techniques enabling causal inferences (Kühnen, Hannover, & Schubert, 2001; Oyserman, 2017; Oyserman & Lee, 2008; Oyserman, Sorensen, Reber, & Chen, 2009) or have explored the ways through which cultural (dis)fluency affects systematic reasoning (Mourey, Lam, & Oyserman, 2015).

The main ideas of the CSC approach are formalized along three central premises. First, culture is a universal process in the sense that it provides a means for all societies through which certain common challenges can be addressed (Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). Variation arises as multiple solutions exist to address these common challenges and the context in which they present themselves does differ (Boyd, Richerson, & Henrich, 2011; Cohen, 2001; Nisbett, 2003; Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). Once a solution, or way of addressing a certain challenge, is found, it tends to stay in place (Cohen, 2001; Oyserman, 2015, 2017). Second, cultural specific content, procedures, and goals are not fixed but rather situated and dynamically constructed (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008; Oyserman et al., 2014). All humans are thus, in principle, capable of behaving and thinking in terms of what a certain culture specifies and contextual cues play an important role in determining which cultural specific content, procedures, and goals are triggered at a certain moment (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008; Oyserman et al., 2014). Culture can consequently be experimentally manipulated, something that makes it possible to pinpoint the causal mechanism through which culture affects behavior and cognition (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008; Oyserman et al., 2014). Third, culture unifies practices as to give its members predictive power and, generally, experience fluency in daily life (Mourey et al., 2015; Oyserman, 2015, 2017). Members know what to expect from one another and can thus generally rely on associative reasoning to go about their lives (Mourey et al., 2015; Oyserman, 2015, 2017).

In this paper, we compare and contrast the insights on how culture shapes cognition generated by the CSC approach with insights generated by research on (cultural) variation in the representation of time. We do this by taking the three central premises of the CSC approach and assessing the extent to which they are supported by research on (cultural) variation in the representation of time. In doing so, we contribute to the literature in three fundamental ways. First, we test the three

premises of culture, as outlined by the CSC approach, on a research area outside of the traditional individualism-collectivism literature. Even though the CSC approach is well-recognized and established within the field, with a range of studies supporting its central premises (Kühnen, Hannover, & Schubert, 2001; Mourey et al., 2015; Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008), testing it outside the individualism-collectivism literature will possibly allow for better insight into the generalizability of their premises on the way culture shapes cognition beyond areas of cognition governed by the individualism-collectivism dimension. Research on (cultural) variation in the representation of time provides an ideal research field to test the CSC approach on as cultural variation in the representation of time has been thoroughly investigated by anthropologists, linguists, as well as social and cognitive psychologists. Second, by comparing and contrasting the insights from these two areas of research for the first time, we identify different ways through which culture shapes cognition, which hopefully is a small first step towards a broader, more encompassing idea of how culture shapes cognition in general. Third, by integrating the two fields for the first time, we generate novel research ideas hopefully useful for researchers working in either the field of cultural psychology or time representation. Before considering the extent to which the three central tenets of the CSC approach resonate with the way that culture is found to operate in spatializing time, a more detailed explanation of the CSC approach and the key evidence supporting it will be summarized.

THE CULTURE-AS-SITUATED-COGNITION APPROACH

Within the CSC approach, culture is seen as a multi-level construct that influences cognition and behavior at three levels (Oyserman, 2015, 2017). At the first level, culture is seen as a universal process through which societies make sense of the world and organize their life and relations (Oyserman, 2011, 2015, 2017). Societies form because cooperation is essential for survival even though it is problematic (Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). Societies use culture to address the universal challenges that arise out of sticking together: relationships need to be managed in such a way as to minimize conflict, group-boundaries need to be clarified, and innovation must be facilitated as to avoid stagnation (Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). Between-group differences arise, as different societies will find different ways to address each of these (Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). This multifinality is generally assumed to occur as a consequence of the diversity in ecological niches in which cultural groups reside (Boyd et al., 2011; Cohen, 2001; Nisbett, 2003; Oyserman, 2011, 2015, 2017; Oyserman et al., 2014).

Research encompassed by this first level typically compares cultural groups to uncover systematic between-group similarities and differences. Building on seminal work by Hofstede (1980), this research has found that the way each culture manages relationships as to minimize conflict, clarifies group-boundaries, and facilitates innovation, is governed by the individualistic and collectivistic dimension (Oyserman, 2011, 2015, 2017; Oyserman et al., 2014). In individualistic societies, the basic unit of analysis is the individual: the individual is seen as agentic and separate from others, uniqueness as well as personal development are valued, and societies are a means through which individual needs can be met (Hofstede, 1980; Markus & Kitayama, 1991; Oyserman & Lee, 2008; Triandis, 1989). In collectivistic societies, the basic unit of analysis is the group: individuals are seen as fundamentally interdependent, harmony and the well-being of the group is valued, and individual needs are subservient to the needs of the group (Hofstede, 1980; Markus & Kitayama, 1991; Oyserman & Lee, 2008; Triandis, 1989). By comparing typical individualistic societies, like the US and Western European countries, to typical collectivistic societies, like Japan and China, a plethora of studies have shown that individualism and collectivism are indeed fundamental in driving differences in values, self-concept, relationality, and cognitive processes (Gardner, Gabriel, & Lee, 1999; Kühnen et al., 2001; Morris & Peng, 1994; Triandis et al., 1990). By doing so, the way in which the world is interpreted and life and social relationships are organized are indeed 'universally' governed by culture in this way with differences only arising because there are different ways to address the same challenges.

The second level of culture as specified by the CSC approach is best understood through the notion of cultural mindsets. Cultural mindsets are cognitive schemas that provide cultural-specific content, procedures, and goals (Oyserman, 2011; Oyserman et al., 2014, 2009). The CSC approach stresses that these cultural mindsets are not fixed, but rather are situated and dynamically constructed (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008). What this implies is that although members of a particular group might be more likely to embrace one mindset over the other – resulting in the between-group differences described above – all humans have, in principle, the capacity to embrace each cultural mindset. A cultural mindset is dependent on contextual cues, features of the immediate situation, or information momentarily or chronically activated in memory (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008).

Research focusing on this operationalization of culture has mostly relied on experimental methods to uncover the situated and dynamic nature of culture. Cultural priming tasks, such as the Similarities and Differences with Family and Friends Task (Trafimow et al., 1991) or the Pronoun-Circling Task (Brewer & Gardner, 1996; Gardner et al., 1999), are used by researchers to trigger either a collectivistic or individualistic

mindset in participants. The triggered mindset has been found to affect performance on subsequent tasks measuring, for example, values, self-concept, perception, and cognition (Brewer & Gardner, 1996; Kühnen, Hannover, & Schubert, 2001; Mandel, 2003; Oyserman & Lee, 2008; Ybarra & Trafimow, 1998). The found effects mimic the differences documented in cross-cultural studies (Kashima et al., 2005; Kühnen, Hannover, Roeder, et al., 2001; Markus & Kitayama, 1991; Nisbett & Miyamoto, 2005; Trafimow et al., 1991). Cultural mindsets, triggered by contextual cues, thus seem to be another way in which culture shapes cognition and subsequent behavior.

At the third level, culture is seen as something that gives members of a cultural group predictive power by unifying certain particular practices (Oyserman, 2015, 2017). Through shaping the way in which things are done in everyday life, members of the same cultural group know what to expect from others, how to behave in social situations, and how to fit in (Oyserman, 2015, 2017). The CSC approach coins 'cultural fluency' to describe the experience of situations unfolding as can be culturally expected and predicts that associative reasoning consequently ensues (Mourey et al., 2015; Oyserman, 2017). Whenever a mismatch is experienced, cultural disfluency is experienced, and the CSC approach predicts that a shift to systematic reasoning will occur (Oyserman, 2015, 2017).

Direct initial empirical proof for this third level of culture comes from a study conducted by Mourey et al. (2015). They manipulated cultural fluency in eight experiments by, for example, matching or mismatching the decorations of a holiday event or by showing pictures of a wedding in which the color of the wedding dress matched or mismatched cultural expectations. After experiencing a match compared to a mismatch, participants were more likely to consume more, purchase a product, and choose the intuitive, wrong answer over a reflective, correct answer. This indicates that participants who experience cultural fluency rely on associative reasoning whereas disfluency will cause a shift to more systematic reasoning (Mourey et al., 2015). So, culture also seems to shape cognition and behavior by creating unified practices as to allow members to know what to expect and allow members to (safely) rely on associative reasoning.

Summarizing, the CSC approach outlines three different levels in which culture operates to shape cognition and behavior: (1) culture as a universal mechanism to interpret the world, organize life, and manage relations with variation arising in systematic ways as there are different solutions to address the same challenges, (2) culture in terms of a situated and dynamically constructed mindset, and (3) culture in terms of its predictive function by unifying particular practices. Within cultural psychology these different operationalizations have largely been tested by studies

focusing on variation according to the individualistic or collectivistic dimension in spite of the fact that not all cultural variation is systemized using this distinction (e.g., spatializations of time). In the following parts, we will look at each of these levels and see to what extent research on cultural variation in the spatialization of time supports these operationalizations. In doing so, we will also see what novel research directions and predictions are generated when integrating insights from these two fields.

CULTURE AS UNIVERSAL MECHANISM: THE EMBODIMENT OF TIME AND CULTURAL VARIATION IN TIME SPATIALIZATIONS EXPLAINED

To see to what extent research on cultural variation in time representation is compatible with the first level of the CSC approach – culture as universal mechanism with variation arising as multiple solutions are possible to address universal challenges – we need to start with acknowledging that in all societies time plays a central role in organizing (daily) life and relations (Hall, 1959, 1983; Levine, 2006). The seemingly universal need for having a shared understanding of this concept makes sense from an evolutionary standpoint, as it benefits cooperation by facilitating planning and coordination. Moreover, many rituals and celebrations of shared values that connect members within the same cultural group have strong temporal components (Hall, 1959, 1983; Levine, 2006). The representation of time poses somewhat of a challenge though as it is an abstract concept that cannot be directly experienced through the senses.

In line with recent theorizing regarding the embodiment of cognition (Barsalou et al., 2003), Conceptual Metaphor Theory puts forward a theory that addresses how we understand abstract concepts like time (Evans & Green, 2006; Lakoff & Johnson, 1980). It supposes that abstract concepts are understood through the linking of these concepts to a more concrete one via a mental metaphor (Evans & Green, 2006; Lakoff & Johnson, 1980). Proof for this idea has come from research which has found that our understanding of abstract concepts like loneliness, morality, and suspicion, are grounded in warmth, cleanliness, and smell respectively (IJzerman et al., 2012; Lee & Schwarz, 2012; Liljenquist et al., 2010; Zhong & Leonardelli, 2008; Zhong & Liljenquist, 2006). In the case of time, as mentioned before, linguistic as well as other empirical evidence points to space as a domain through which time is *inter alia* understood (Boroditsky, 2000; Boroditsky & Ramscar, 2002; Casasanto & Boroditsky, 2008; Casasanto et al., 2010; see Sinha, Sinha, Zinken, & Sampaio, 2011, for an exception) and it appears the same computational system in the brain underlies both space and time (Walsh, 2003). Evidence for space-time mappings has even been found in monkeys

(Merritt, Casasanto, & Brannon, 2010) and the spatial coding of ordinal information has even been observed amongst 7-month-old infants (de Hevia, Girelli, Addabbo, & Cassia, 2014).

Many researchers working on time representation have attempted to describe and systemize how time is represented (e.g., Evans, 2003; McTaggart, 1908; Moore, 2011; Núñez, Motz, & Teuscher, 2006) and even successfully integrated large sets of empirical observations with the resulting taxonomies (Bender & Beller, 2014). This research has demonstrated that time representation is multi-faceted and that the range of cultural variation observed in empirical observations cannot be easily systemized. When applying the first level of the CSC approach, and thinking about cultural variation as different solutions to a similar universal, yet specific, problem, Galton's analysis (2011) of the attributes of time provide a clear starting point according to which variation can be organized.

Cross-Cultural Variation in Time as Variation in Linearity, Directionality, and Transience

Galton (2011) delineates four attributes of time that constitute our temporal experience: extension, linearity, directionality, and transience (for a summary see also Bender & Beller, 2014). Extension concerns the fact that time has separate parts, moments that can be distinguished from other moments: "things that are otherwise identical, such as the same action by the same subject in the same place, can be numerically distinct solely by occupying distinct times" (Galton, 2011, p. 697). Linearity refers to the betweenness of temporal events: when thinking of three distinct events in time, one event is always in-between, or in the middle of, the other two (Galton, 2011). Directionality refers to the asymmetry between the past and future that is inherent in time; this property of time is also described as the 'arrow of time'. Transience refers to the fleetingness of time: the 'now' is only there for an instant. With the exception of extension, these attributes do not have a precise translation to the spatial domain though; consequently several 'options' exist through which these temporal attributes are spatialized.

Cross-cultural variation when spatializing linearity: Vertical vs. horizontal spatializations

Part of the documented cultural variation in the representation of time reveals different spatializations of linearity, or the betweenness of temporal events. This property can only be spatialized when restricting oneself to one dimension. As space has multiple dimensions, several options are available and different cultures indeed use different dimensions. For example, speakers of English almost exclusively project time onto

the horizontal dimension of space (either the sagittal or lateral axes) to experience linearity (Boroditsky, 2001; Boroditsky et al., 2011; Cooperrider & Núñez, 2009; Fuhrman & Boroditsky, 2010; Tversky et al., 1991). This bias is apparent in linguistic expressions (employing the sagittal axis) such as *bad days we left behind* and *the holidays are ahead of us* and has been confirmed in reaction time experiments involving vertical and horizontal spatial primes (Boroditsky, 2001; Boroditsky et al., 2011). In contrast, in Mandarin, time is often talked about using the vertical dimension alongside the horizontal dimension: events can be above or below other events, as well as being in front or behind other events, or to the left or right of other events (Chen, 2007; Miles, Tan, Noble, Lumsden, & Macrae, 2011). This vertical projection, on top of a horizontal one, amongst speakers of Mandarin is also echoed in reaction-time experiments (Boroditsky, 2001; Boroditsky et al., 2011; Lai & Boroditsky, 2013; Miles et al., 2011).

Cross-cultural variation when spatializing directionality: Left-to-right, right-to-left, future-in-front, past-in-front, and east-to-west spatializations

Another part of the documented cultural variation in the representation of time reveals different spatializations of directionality. Space does not inherently have directionality, or asymmetry, in terms of a past and a future, thus opening the way for different cultures to spatialize this differently. As directionality is contingent upon linearity, the cultural variance discussed above in relation to the vertical and horizontal axes also applies here. Additional documented variance between cultures vis-à-vis directionality concerns how the past and future are mapped onto the sagittal axis. For example, speakers of English and Spanish project time *inter alia* onto the sagittal axis with the arrow of time projected from left-to-right: past or earlier events are placed left while future or later events are placed right (Casasanto & Jasmin, 2012; Cooperrider & Núñez, 2009; Fuhrman & Boroditsky, 2010; Lakens, Semin, & Garrido, 2011; Santiago et al., 2007; Tversky et al., 1991). In contrast, speakers of Arabic and Hebrew project the arrow of time from right-to-left (Fuhrman & Boroditsky, 2010; Tversky et al., 1991). Other variation vis-à-vis directionality implicates the sagittal axis where the ego is used as deictic reference point. Speakers of English map past events behind the body and future events to the front of the body (Lakoff & Johnson, 1980; Ulrich et al., 2012). On the other hand, speakers of Aymara, Malagasy, and Darijia map past events to the front of the body and future events to the back of the body (Dahl, 1995; de la Fuente et al., 2014; Moore, 2011; Núñez & Sweetser, 2006). Other variations include the Yupno who rely on the allocentric topographical terms *uphill* and *downhill* (Núñez, Cooperrider, Doan, & Wassmann, 2012) and the Pormpuraaw who make use of a non-deictical axis – the cardinal system – to denote directionality (Boroditsky & Gaby, 2010; Gaby, 2012)

Cross-cultural variation when projecting transience: Ego- and time-moving representations

Another part of the cultural variation documented in between-group comparisons of the spatialization of time has revealed different ways in which cultures project transience, or the experience of fleetingness. Two spatializations, both of which lead to the experience of transience in different ways, are commonly contrasted (McGlone & Harding, 1998). In the ego-moving representation, transience is spatialized by envisioning the self moving along a timeline, much like moving along a path. In the time-moving representation, transience is spatialized by having the events on a timeline pass the self by, much like a river would flow past the self that is standing stationary on the bank. Corpora studies using both spoken and written data reveal that both these representations occur frequently in English (McGlone & Pfiester, 2009). Psychological experiments making use of an ambiguous question, (e.g., *Next week, Wednesday's meeting has been moved forward by two days. On which day is the meeting?*) confirm this (Boroditsky, 2000; Gentner, Imai, & Boroditsky, 2002; McGlone & Harding, 1998; Rothe-Wulf, Beller, & Bender, 2015). The answer to such an ambiguous question is dependent on which representation one uses. Usually, around half of the English-speaking participants will provide an answer that is consistent with an ego-moving representation (i.e., *Friday*), while the other half will confidently provide an answer that is consistent with a time-moving representation (i.e., *Monday*; Boroditsky, 2000; Gentner et al., 2002; McGlone & Harding, 1998; Rothe-Wulf et al., 2015). Speakers of other languages, however, exhibit different patterns. In Mandarin, ego-moving expressions appear less frequently than time-moving expressions (Lai & Boroditsky, 2013) and Mandarin speakers almost exclusively provide an answer that is consistent with a time-moving representation (Bender, Beller, & Bennardo, 2010; Lai & Boroditsky, 2013). Speakers of Malagasy exhibit a similar preference. Linguistic expressions attest to this (e.g., when wishing each other Happy New Year it is common to say: "Congratulations, for being reached by the year") and explicit inquiries also indicate that temporal expressions using *before*, *behind*, and *above* are understood through a time-moving spatialization, with temporal events approaching the ego (Dahl, 1995, p. 199).

Cross-Cultural Variation in Time Spatializations Explained

As seen in the above paragraphs, the (cross-cultural) work on variation in time representation reveals different ways in which different cultures have spatialized three different attributes of time, linearity, directionality, and transience. This is compatible with the way culture is operationalized under the first level of the CSC approach: culture as universal process to address certain problems (the representation of time) with variation arising as different solutions (different spatializations) exist to address

these problems. We will now address why these different cultures employ these different possibilities – why does time flow from left-to-right in some cultures while in others it flows from east-to-west – and how this compares to the way that variation is commonly explained within studies typically cited within the CSC approach.

A first source that is commonly cited to drive differences in spatializations of time is language. More specifically, the use and/or frequency of certain temporal metaphors in language are said to underlie cognitive differences in representations of time. Namely, the differences in the way that linearity is spatialized between speakers of English and Mandarin is attributed to language: in English, spatial words related almost exclusively to the sagittal axis are used to describe linearity whereas in Mandarin spatial words related to the vertical axis are also used (Boroditsky, 2001; Boroditsky et al., 2011; Lai & Boroditsky, 2013; Miles et al., 2011). Similar parallels between cognitive representation and language are found in the way that directionality is spatialized in speakers of English, Aymara, and Malagasy (Dahl, 1995; Moore, 2011; Núñez & Sweetser, 2006; Ulrich et al., 2012), and in the way that transience is spatialized in English and Mandarin (Bender et al., 2010; Lai & Boroditsky, 2013). Moreover, studies involving bilinguals and/or experimental manipulation also implicate language as factor in shaping our cognitive representations of time (Boroditsky, 2001; Lai & Boroditsky, 2013).

Another source commonly considered to underlie differences in spatializations of time is spatial cognition, more specifically, cross-cultural differences in terms of preferred spatial frames of reference (Bender & Beller, 2014; Boroditsky & Gaby, 2010; Núñez et al., 2012). Spatial frames of reference refer to the system according to which the location of objects in space is encoded linguistically and conceptually. A distinction is made between three different frames: an absolute, intrinsic, and relative frame of reference (Levinson, 2003). Cultural groups differ in terms of which frame of reference they prefer to invoke to encode space and location. The Pormpuraaw adopt an absolute frame of reference and will say things such as, "*move your cup over to the north-northwest a little bit*" (Boroditsky & Gaby, 2010, p. 1). This is very similar to how the Pormpuraaw think about time, suggesting that differences in the way that we think and talk about space might indeed lead to differences in our thinking about time. The Yupno provide another example: the allocentric topographic terms of *uphill* and *downhill* are used to describe spatial location as well as temporal relations between events (Núñez et al., 2012; Wassmann, 1994).

On top of language and spatial cognition, several other 'drivers' of variability in spatializations of time have been identified. The documented variation in the spatialization of directionality along the sagittal axis in speakers of English, Spanish, Arabic, and Hebrew is attributed to their respective writing systems: where English

and Spanish speakers write from left-to-right, Arabic and Hebrew speakers write from right-to-left (see also Casasanto & Bottini, 2014). Additionally, spatial movement (Boroditsky & Ramscar, 2002), valence (Margolies & Crawford, 2008; McGlone & Pfiester, 2009), emotions (Hauser et al., 2009; Richmond et al., 2012), and personality traits such as conscientiousness and procrastination (Duffy & Feist, 2014; Duffy et al., 2014) have all been related to the ego- and time-moving representations, two possibilities for spatializing transience. Furthermore, the study by de la Fuente et al. (2014) on speakers of Darija and Spanish showed that temporal focus determines the spatialization of directionality: when the past is given prominence over the future the past is more likely to be projected to the front of the body and the future to the back than vice versa. This is corroborated by Li, Bui, and Cao (2017) who found that Northern Vietnamese, compared to Southern Vietnamese, are more likely to project the future to the back of the body and the past to the front because they have a more past-oriented temporal focus.

Each of these sources of cultural variation in time representation can only account for part of the variation but not all. For example for language, the study by de la Fuente et al. (2014) showed that the Darija represent directionality in the opposite direction of what their language dictates: they think about the past to the front and the future to the back, even though they talk about the past as being to the back and the future to the front. Similarly, differences in spatial cognition seem to shape time spatialization for some groups but not all: studies using American, German, Tongan, Swedish, and Chinese populations have revealed that there are, in general, low levels of consistency across the preferred spatial frame of reference and the preferred temporal frame of reference (Bender et al., 2010; Bender, Rothe-Wulf, Hüther, & Beller, 2012).

The identification of a versatile set of drivers that underlie cultural variation is characteristic for research on time representation. In contrast, cultural variation typically looked at in cultural psychology research and the CSC approach, generally relates back to the individualism-collectivism dimension. To such an extent that Oyserman (2017) even claims that culture has "come to mean individualism and collectivism for much of psychology" (p. 450). Interestingly, this dimension has not been investigated in relation to variation in time representation (see Majid, Bowerman, Kita, Haun, & Levinson, 2004, for data on how variation in terms of preferred spatial frames of references does not relate to the indidualism-collectivism dimension). Moreover, the identification of multiple vs. one driver behind cultural variation has had consequences for the way culture is viewed to affect cognition and behaviour by the two research areas.

The identification of one underlying dimension within cultural psychology, to which most cultural variation can be attributed to, has allowed a subset of cultural psychologists, of which some are working with the CSC approach specifically, to focus in on this dimension (see, however, Fiske, 1992; Medin & Atran, 2004; Schweder, 1991) and explore the reasons for why individualistic or collectivistic tendencies were more likely to develop in certain areas. Nisbett (2003), for example, convincingly argues for the idea that ecological differences between the environment of the ancient Greeks and Chinese has led these two societies to develop different ways of sustaining themselves and consequently adopt different ways to address, what CSC would name, the common challenges of how to interpret the world, organize life, and manage relations. In similar vein, Talhelm et al. (2014) showed that a history of farming wheat vs. rice makes societies more individualistic and collectivistic respectively. So, researchers working within cultural psychology, specifically the CSC, have been able to provide insight on how cultural differences come about by showing that differences in ecological niches determine which solutions societies come up with to address the common problems they face.

On the other hand, the identification of a versatile set of drivers behind (cultural) variation in time spatializations has given insight into the myriad ways in which specific culturally shaped phenomena interact in complex ways to sustain certain ways of thinking and doing. Through phenomena such as language and writing systems, certain ways of thinking about time are passed on from generation to generation. As children are born and raised into certain cultural groups they are exposed to these phenomena and their thinking will be influenced. In addition, by identifying several phenomena researchers working on explaining differences in time spatializations have been able to compare and contrast these phenomena and give insight into which phenomena are decisive under which specific circumstances (Alloway, Ramscar, & Corley, 2002; Torralbo, Santiago, & Lupiáñez, 2006).

CULTURE AS SITUATED AND DYNAMICALLY CONSTRUCTED MINDSETS: THE FLEXIBILITY OF TIME SPATIALIZATIONS

The second level of culture as specified by the CSC approach defines culture in terms of situated and dynamically constructed mindsets. Studies in which cultural mindsets are primed provide support for this idea as they show that cultural-specific content, procedures, and goals are indeed not fixed but dependent on contextual cues (Oyserman, 2011, 2015, 2017; Oyserman & Lee, 2008). As we will see below, several

studies within the field of time representation also indicate that time spatializations are not fixed but rather dependent on contextual cues, thereby supporting the second level of culture as specified by the CSC approach.

Outside the cross-cultural domain, support for the idea that spatializations of time are not fixed but rather dependent on contextual cues comes from experiments conducted on English speakers with the ego- and time-moving representations; two opposite ways in which transience is spatialized (Boroditsky, 2000; Gentner et al., 2002; Lakoff & Johnson, 1980; McGlone & Harding, 1998; Rothe-Wulf et al., 2015). These experiments show that even though people might have a default preference for one or the other representation based on their personality (Duffy & Feist, 2014; Hauser et al., 2009; Richmond et al., 2012), the representations used to represent time can be influenced by context, spatial primes, or even the different framing of events (Boroditsky, 2000; Boroditsky & Ramscar, 2002; Gentner et al., 2002; Hauser et al., 2009; Lee & Ji, 2014; Margolies & Crawford, 2008; Matlock, Holmes, Srinivasan, & Ramscar, 2011; McGlone & Pfiester, 2009; Miles et al., 2011).

In the cross-cultural domain, support for the idea that time spatializations are not fixed comes from research involving English-Mandarin bilinguals using the ambiguous Wednesday question that gauges whether participants use an ego- or time-moving representation to represent transience. The question was posed to the bilingual participants in either English or Mandarin: the language in which they were asked the ambiguous question affected their answer, showing that they can switch between different spatializations (Lai & Boroditsky, 2013). This finding closely mirrors traditional CSC studies, which show that language used within the experiment influences self-construal, which refers to the extent to which the self is defined in terms of independence or interdependence: when asked in English, bilinguals report more individualistic self-concepts than when asked in Mandarin or Cantonese (Kemmelmeier & Cheng, 2004; Ross, Xun, & Wilson, 2002; Trafimow, Silverman, Fan, & Law, 1997; Watkins & Gerong, 1999).

Moreover, direct confirmation for the notion that different time spatializations are not fixed comes from a recent study that has focused on different spatializations of directionality, specifically on variation with regard to whether the future is represented at the front of the body or at the back in monolingual and monocultural groups. De la Fuente et al. (2014) showed that the future-to-front and past-to-back mapping could easily be reversed in participants using experimental manipulations, for example, by making the past or future more salient. A study by Torralbo et al. (2006), furthermore,

showed that where this front is precisely projected to in the spatialization of directionality can also be influenced by experimental manipulations, again showing the flexibility of these spatializations.

The notion that differences are not fixed but situated and dynamically constructed might also explain some of the problems researchers have found in replicating cross-cultural effects regarding time spatializations. For example, replicating results vis-à-vis the vertical spatialization of linearity in speakers of Mandarin found by Boroditsky (2001), Boroditsky et al. (2010), Miles et al. (2011), and Lai and Boroditsky (2013), has proven difficult (see Chen, 2007; Chen & O'Seaghdha, 2013; January & Kako, 2007). This presents a problem when working from the assumption that language determines these spatializations and that all speakers of Mandarin must thus have this spatialization active at any given point. Based on the second level of the CSC approach, a vertical spatialization might be the default spatialization in speakers of Mandarin, but at the same time determined by contextual factors such as the experimental set-up.

Cultural psychologists working with CSC's second level of culture have deliberately exploited the fact that cross-cultural differences are not fixed but dependent on contextual cues. In doing so, they move beyond describing and cataloguing differences by exploring the consequences of having these differences through experimental manipulation. Within research on time spatialization several advances in this direction have also been made. For example, based on research on individual differences in ego- and time-moving representations used by English speakers, we know that these two different spatializations of time are not simply linguistic artifacts but are meaningful psychological constructs (Hauser et al., 2009; Richmond et al., 2012). An ego-moving representation is linked to agency, positive valence, happiness, and anger, while a time-moving representation is linked to negative valence, depression, and sadness (Hauser et al., 2009; McGlone & Pfiester, 2009; Richmond et al., 2012). Moreover, people who score higher on future time perspective – in other words, who are more likely to be constantly thinking about and planning for the future – are more likely to spatialize time using an ego-moving representation than a time-moving representation (Richmond et al., 2012). Conscientiousness, which involves tasks being moved *forward* to the present, towards the self, has, in turn, been linked to the time-moving representation and procrastination, which involves tasks being moved *forward* into the future, to the ego-moving representation (Duffy & Feist, 2014; Duffy et al., 2014).

Cultural differences related to the way that directionality is spatialized have also been linked to psychologically meaningful constructs. Specifically the difference between

mapping the past to the front or back and the future to the back or front has been found to be related to differences in time perspective (de la Fuente et al., 2014; H. Li et al., 2018). Time perspective gauges whether people attribute more importance to the past, present, or future (Zimbardo & Boyd, 2008) and has been found to underlie differences in academic engagement, health and financial decision-making, risky behavior, and environmental attitudes (Horstmanshof & Zimitat, 2007; Milfont & Gouveia, 2006; Rothspan & Read, 1996; Webley & Nyhus, 2005; Zimbardo et al., 1997). With respect to the spatialization of directionality, it has been found that past-oriented societies, as well as past-oriented individuals, spatialize directionality with the past-to-front mapping (de la Fuente et al., 2014). Moreover, if the past is given more emphasis through experimental manipulation, participants are more likely to place the past in front of the body (de la Fuente et al., 2014).

Knowing the consequences of these different spatializations thus helps in our understanding of differences between societies and how they might be sustained over time. This opens new avenues for research, as several time spatializations have yet to be explored. For example, does having a vertical spatialization as opposed to a horizontal one also have certain implications for the way that events are viewed? From a grounded cognition perspective, verticality has been linked to valence as well as power (Giessner & Schubert, 2007; Meier & Robinson, 2004; Schubert, 2005). It can be hypothesized that this effect carries over to the spatialization of time along this dimension. Specifically, placing the past above the future may lead to a more positive evaluation and to more importance being attributed to the past compared to the future.

Similarly, in relation to the Pormpuraaw, who have a non-deictic east-to-west spatialization of directionality (Boroditsky & Gaby, 2010; Gaby, 2012), the orienting of temporal events without reference to the person may lead to a different conceptualization of causality. Is the person seen as less in control of events and perhaps less likely to plan for the future? Furthermore, conceptualizing such a fundamental concept non-deictically may have even greater implications, for example, in relation to theory of mind. When one's cognition about time and space do not highlight the possible distinct viewpoints of the actor and observer, this might carry-over and affect perspective taking and theory of mind.

Moreover, differences between the ego- and time-moving representations are relevant to consider in the cross-cultural domain as well. Amongst English speakers, an ego-moving representation is linked to agency but the time-moving representation is not (McGlone & Pfiester, 2009; Richmond et al., 2012). Unlike Mandarin speakers, who prefer a time-moving representation, it has been found that Americans prefer

an 'agentic' ego-moving representation (Lai & Boroditsky, 2013). This thus resonates with the cross-cultural differences found between these societies in regard to agency. Individualistic societies, such as the United States, value personal agency and independence above interdependence and harmony. The individual, not the group, is seen as the basic unit (Markus & Kitayama, 1991; Oyserman & Lee, 2008). This contrasts with collectivistic societies, such as China, where the self is defined in terms of relationships and interdependence is valued (Markus & Kitayama, 1991; Oyserman & Lee, 2008). These differences affect causal attribution, with Americans more likely to attribute agency to individuals and Chinese more likely to attribute it to the context and/or the group (Chiu et al., 2000; Kashima et al., 2005; Menon et al., 1999; Morris & Peng, 1994). The preferred time-moving representation of speakers of Mandarin could be reflective of this difference in agency, as attributing agency to the individual is not consistent with their cultural view of causality.

CULTURE AS PARTICULARIZED PRACTICES AND ITS PREDICTIVE POWER: SWITCH COSTS AND DIFFERENT SPATIALIZATIONS AS FLUENCY MANIPULATION

The third level at which culture is operationalized within the CSC approach focuses on the predictive power it gives to members through particularized practices (Mourey et al., 2015; Oyserman, 2015, 2017). By having a certain way in which things are done, members of cultural groups know what to expect from others and can adjust their own behavior accordingly. The CSC approach predicts that when situations unfold following cultural expectations, members experience fluency and can thus rely on associative reasoning as to save mental resources; when situations unfold contrary to cultural expectations, members will experience disfluency and a shift to systematic reasoning is expected to occur (Mourey et al., 2015; Oyserman, 2015, 2017).

Abundant support for the idea that cultural differences regarding time may lead to disfluency can be found in the more general research on time across cultures. This research has looked at differences in relation to, for example, clock versus event time, punctuality, the pace of life, and polychronic versus monochronic uses of time and found that for travelers, expats, and international businesspeople, these differences constitute one of the most difficult things to master when encountering other cultures (Brislin & Kim, 2003; Hall, 1959, 1966, 1983; Levine, 2006; Spradley & Phillips, 1972). The few studies that are available on time spatializations in support of this third level focus on the ego- and time-moving representations amongst speakers of English: English speakers experience a switch-cost when switching between these two representations (McGlone & Harding, 1998; Richmond et al., 2012). A switch-cost

is generally assumed to result from executive functioning processes, with higher switch-costs found whenever executive functioning is impaired (Kramer, Hahn, & Gopher, 1999; Rogers et al., 1998). Executive functioning is implicated in experiences of cultural disfluency by Mourey et al. (2015) who indeed found that when presenting participants with culturally unexpected situations/stimuli, compared to culturally expected situations/stimuli participants switched from associative reasoning to systematic reasoning.

In combining insights from CSC research and time representation research on culture as unified particularized practices that gives members predictive power, several new research directions become clear. Extending the switch-cost research on the ego- and time-moving representations, research could look at whether a similar type of switch-cost can be observed in biculturals, who are, for example, confronted with opposing spatializations of directionality (e.g., left-right vs. right-left; or past-to-front vs. past-to-back) or, alternatively, with individualistic and collectivistic content. Extending the research by Mourey et al. (2015), research could consider manipulating cultural fluency using different time spatializations and seeing how systematic reasoning is affected.

CONCLUSION

Research using the CSC approach as well as research on cultural variation in the representation of time has both generated extensive insight into the way that culture operates to shape societies, behavior, and cognition. In this paper, we have taken an interdisciplinary approach and integrated these two research areas by testing the three main premises of the CSC approach against research on cultural variation in the representation of time. In doing so, we have not only provided support for the CSC's predictions outside of the traditional literature in cultural psychology – which is dominated by the individualism/collectivism dimension – but also generated novel research ideas.

The first level of culture as outlined by the CSC – culture as universal mechanism with variation arising as multiple solutions are possible to address challenges – is, mostly, supported by research on cultural variation in the representation of time; even though clear differences are observed in the formulization and concretization of this level. The CSC approach has focused (exclusively) on the universal problem of sticking together and described individualism and collectivism as two solutions to this problem. Individualism and collectivism are argued to present solutions as they provide a way through which relationships are managed, group-boundaries are clarified, and innovation is facilitated. As most cultural variation described in the cultural psychology

literature can be attributed to the individualism-collectivism dimension, the CSC approach has stayed focused on this and integrated theorizing about how different cultures developed a proclivity for either solution. Research on cultural variation in the representation of time, however, focuses on quite a different and specific problem, namely the representation of the abstract concept of time. Conceptual Metaphor Theory argues that all abstract concepts are understood through a more concrete domain. The (cross-cultural) research generally supports this as space is used to talk and represent time in almost all cultures studied so far (however, see Sinha et al., 2011). Variation occurs as different ways of spatializing time are possible though. By integrating the two approaches we have shown that this variation can be understood and catalogued when considering the attributes of time that do not have a direct mapping to space: linearity, directionality, and transience. Rather than identifying one underlying dimension at the base of these different spatializations of time, research on cultural variation in the representation of time has identified several drivers that propagate cultural differences and transfer it from generation to generation. Combining these fields, it thus becomes apparent that culture shapes cognition and behavior in both global and specific ways, with differences in ecological niches shaping cultural differences, cultural norms being transferred from one generation to the other, *inter alia*, via such phenomena as language, values, and writing systems.

The second level of culture as outlined by the CSC – culture as situated and dynamic mindsets – is largely supported by research on cultural variation in the representation of time. More and more research is showing the flexibility of time spatializations and the role of contextual cues in 'activating' them, underscoring that these cultural differences too are likely not fixed. Both fields have started to develop the methodology to explore the reasons behind and consequences of cultural differences. When integrating the two fields, the need to move beyond a description and classification only becomes stronger and several unexplored hypotheses and ways to test them become apparent.

Some initial support for the third level of culture as outlined by the CSC – culture as particularized practices and its predictive power – can also be found in research on cultural variation in the representation of time. Namely, research shows that a switch cost occurs when people are confronted with different spatializations. It would be interesting to test whether such a switch-cost is observed when people are asked to switch between individualistic and collectivistic content. Similarly, cultural researchers could exploit time spatializations as an ecologically valid way to invoke disfluency and corroborate earlier findings that show that cultural disfluency leads to a switch to systematic reasoning.