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Event Centrality of Positive and Negative Autobiographical Memories to Identity and Life Story Across Cultures

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Abstract

The aim of this study was to investigate whether cultural differences exist in event centrality, emotional distress, and well-being in a total of 565 adults above age 40 from Mexico, Greenland, China, and Denmark. Participants completed questionnaires to determine their level of Post-traumatic Stress Disorder (PTSD) and depression symptoms, and of life satisfaction. They also completed event centrality scales for their most positive and most negative life events. Across cultures, participants rated positive events as more central to their identity and life stories, compared with negative events. Furthermore, participants with higher levels of emotional distress rated negative events as more central to their identity and life story, compared with participants with lower scores. However, a converse pattern was not found for positive events. Finally, participants with higher scores of life satisfaction tended to rate positive events as more central and negative events as less central to their identity and life story, compared with participants with lower scores. It is concluded that across cultures, positive events are considered more central to identity and life story than negative events and that event centrality ratings tend to be affected in similar ways by higher versus lower levels of emotional distress or well-being.

Event Centrality of Positive and Negative Autobiographical Memories to Identity and Life Story Across Cultures

In *Anna Karenina*, Leo Tolstoy (1878/2014) wrote: “*Happy families are all alike; every unhappy family is unhappy in its own way*”. In this phrase, Tolstoy seems to refer to the fact there is something about positive emotional valence that renders all happy families equal, while there is something about negative emotional valence that makes unhappy families distinct from each other. Does a similar phenomenon occur with the centrality of memories of positive and negative life events to a person’s identity and life story, across cultures? Are positive events all highly central and is every negative event central in its own way? The aim of the present study was to investigate the centrality of autobiographical memories of the most positive and most negative life events to identity and the life story across cultures. In order to do so, we collected data in four different countries: Mexico, Greenland, China, and Denmark; thus representing Latin American, Arctic, East Asian, and European samples, respectively. This allowed for cross-cultural comparisons in the centrality of highly emotional life events, and their relationship to emotional distress and well-being, indexed by life satisfaction. Specifically, we compared the centrality of self-generated memories of the most positive and most negative life events. This comparison allowed us to investigate whether positive and negative life events differed on the degree to which they were considered as central to an individual’s identity and life story across countries. We also compared the centrality ratings for the most positive and most negative events in individuals with higher versus lower scores in measures of PTSD, depression, and life satisfaction, across countries.

Positivity Bias in Autobiographical Memory

During their lifetime, individuals experience both emotionally positive and negative events. Many positive events are associated with transitional moments in life, such as falling in love, graduating from college, finding a job, getting married, or having children — these events are typically contained in the cultural life script (Berntsen & Rubin, 2004). Examples of negative events can be tragic accidents, the death of a loved one, a serious disease, or sexual assault. The cultural life script is semantic knowledge about commonly shared cultural expectations regarding the order and timing of important transitional life events (Berntsen & Rubin, 2004). As most of the events in the life script are positive events located during adolescence and early adulthood, the cultural life script was proposed as a potential explanation of the reminiscence bump. The cultural life script is conceptually related to the cultural concept of biography (Habermas & Bluck, 2000; Habermas, 2007).

Although the emotional intensity associated with an event is a stronger predictor for memory characteristics than positive versus negative valence (Talarico, LaBar, & Rubin, 2004), the emotional valence of an event also has some effects on subjective experience and memory performance (Schooler & Eich, 2000), self-concept and self-appraisals (Heine & Hamamura, 2007; Ross, Heine, Wilson, & Sugimori, 2005), and the imagination of future scenarios (Sharot, 2011b) and future life stories (e.g., Bohn, 2011; Bohn & Berntsen, 2011). Regardless of valence, memories of emotional events are usually highly vivid. However, those of positive events, compared with negative events, often contain more peripheral details, whereas memories of negative events tend to focus on the most central details (e.g., Berntsen, 2002; Talarico, Berntsen & Rubin, 2009; see Kihlstrom, Eich, Sandbrand, & Tobias, 2000 for a review). Furthermore, when individuals are asked to recall important life events from their personal past, they generally report more positive than negative events (Berntsen & Rubin, 2002, 2004; Bohn, 2010; Collins, Pillemer, Ivcevic, & Gooze, 2007;

Erdoğan, Baran, Avlar, Taş, & Tekcan, 2008; Janssen & Rubin, 2011; Leist, Ferring, & Filipp, 2010; Rasmussen & Berntsen, 2009; Rubin & Berntsen, 2003; Rubin, Berntsen, & Hutson, 2009; Walker, Skowronski, & Thompson, 2003). Self-enhancement theories also claim that individuals are naturally motivated to focus on positive information about themselves (Marshall & Brown, 2008), although some cultural differences seem to exist (Heine & Hamamura, 2007). The fading affect bias – i.e., the findings that the affect of negative events fades faster than the affect of positive events (Walker, Vogl, & Thompson, 1997), seems to also contribute to the recall of more positive life events. Recently, this mechanism has been shown to be present across several cultures (Ritchie et al., 2014).

The dominance of positive relative to negative event is also found in studies using a narrative approach. In a series of studies, Fromholt and colleagues (Fromholt & Larsen, 1991; Fromholt, Larsen, & Larsen, 1995; Fromholt, Mortensen, Torpdahl, Bender, Larsen, & Rubin, 2003) asked older individuals to tell their life story to an interviewer. The stories were analyzed for whether the narrated events were positive, negative or neutral. Across groups of centenarians, 80-year old individuals with dementia, with depression, and healthy controls, considerably more positive than negative events were reported, except in the depressed group. Participants in the depressed group reported more negative than positive events, but only for memories from the most recent five years. During follow-up, once most of the participants in the depressed group had recovered, such negativity bias had disappeared.

Despite the robust evidence for the dominance of positive events in autobiographical remembering, and despite the fact that “narrative researchers have suggested that positive memories constitute an important part of narrative identity” (McLean & Pals, 2008, p. 753), there is some evidence from the narrative approach that negative affect features prominently in life stories and narrative identities; especially in the case in which such negative affect has been resolved or has turned positive, such as in the case of redemptive stories or growth after

difficulties (Bauer, McAdams, & Pals, 2006; McAdams, 2006); closeness and separation stories in parental and peer relationships that contain conflict in them (McLean & Thorne, 2003) and life-threatening events (Thorne & McLean, 2002, 2003) during adolescence.

In summary, healthy individuals prefer to focus on, recall, and imagine positive information. However, for emotionally distressed individuals, such as those who suffer from post-traumatic stress disorder (PTSD) and depression, negative and traumatic events or negative information may be more memorable than positive events or positive information; and their predictions about the future tend to be more pessimistic (Sharot, 2011; Strunk, Lopez, & DeRubeis, 2006; Watkins, 2002). Another way in which negative events may become more salient in memory is when they are part of positive narratives of redemption, which are also associated with well-being (McAdams, 2006; McAdams, Reynolds, Lewis, Pattern, & Bowman, 2001).

In the autobiographical memory literature, the impact that emotionally positive and negative events have on an individual's well-being seems to be related to how these emotional events become incorporated into the individual's identity and life story. For example, positive memories are rated as more central to identity and life stories than negative memories; and high event centrality of negative memories is associated with higher levels of PTSD and depression symptoms (Berntsen & Rubin, 2006; Berntsen, Rubin, & Siegler, 2011; Rubin, Boals, & Berntsen, 2008).

Event Centrality for Emotionally Positive and Negative Events

The Centrality of Event Scale (CES; Berntsen & Rubin, 2006) measures the extent to which a life event, positive or negative, is central to an individual's identity and life story. An event becomes central when it is considered as an important part of an individual's identity and life story, when it changes the way he or she views the world in everyday life, and when

it is seen as a turning point in the personal life story. The CES was originally developed to examine the centrality of traumatic events in relation to PTSD symptoms (Berntsen & Rubin, 2006). However, more recently it also has been used to measure the centrality of other autobiographical events, such as highly positive events (e.g., Berntsen et al., 2011).

There is some empirical evidence showing that individuals tend to assign different event centrality ratings to life events according to whether the event is emotionally positive or negative. For instance, when comparing the event centrality ratings of positive and negative events reported by a large sample of more than 2,600 older participants, Berntsen et al. (2011) found that the positive events were rated significantly higher than the negative events. However, other studies conducted with undergraduate samples did not find significant differences in the centrality ratings of positive and negative events (Boals, 2010; Rasmussen & Berntsen, 2009). These results may suggest that older adults, compared with younger adults, view positive events as more central to their identity and life story than negative events. This is consistent with studies that show a positivity bias in autobiographical memories in old adults (e.g., Mather & Carstensen, 2005).

Other analogues of event centrality for identity in the narrative approach have also been investigated; for example, McLean and Pals (2008) found that positive (high-point) memories were rated as serving a higher identity function of autobiographical memory compared with negative (low-point) memories.

Event Centrality as a Function of Emotional Distress and Well-being

Investigation of the event centrality of highly emotional events is relevant not only for the field of autobiographical memory, but also for that of mental health and psychological functioning. Several studies have revealed that participants with higher levels of PTSD and depression symptoms report a traumatic or negative event to be more central to their identity

and life story than participants with lower levels of PTSD and depression symptoms (e.g., Berntsen & Rubin, 2006; Berntsen et al., 2011; Boals, 2010; Brown, Antonius, Kramer, Root, & Hirst, 2010; Rubin et al., 2008). This positive correlation between centrality of the negative event and symptoms of PTSD is also found when controlling for other factors, such as neuroticism, anxiety, and severity of the trauma. Furthermore, it has also been found for events that do not fulfill the diagnostic criteria for trauma (see Berntsen & Rubin, 2014, for a review).

In contrast, the robust relation that exists between the centrality of negative events and symptoms of emotional distress is not found for positive events. In their sample of older Americans, Berntsen et al. (2011) found that the centrality of negative events was positively correlated with symptoms of PTSD and depression; yet such correlations were not found for the event centrality of positive events. Boals (2010) reported similar findings in a study that surveyed a sample of undergraduate students. He found that the event centrality of negative events correlated with both symptoms of PTSD and depression, but he found no significant correlations between the level of PTSD or depression and centrality of a positive event. Therefore, when comparing the centrality of positive and negative events with measures of emotional distress, the literature suggests that the extent to which highly traumatic and negative events become central to an individual's identity and life story varies as a function of the level of PTSD and depression symptoms, whereas no similar relation is seen for the event centrality of highly positive events. Following these findings, Berntsen et al. (2011) claimed that emotionally positive and negative life events relate very differently to identity and life story, at least when measured in Western samples. Positive events might be considered as central to identity and life story as a result of culturally transmitted norms, whereas negative events might gain centrality as a function of more individual and emotion driven processes associated with emotional distress. An important aim of the present work was to examine

whether the difference in centrality between positive and negative life events also applied across cultures.

Cultural Differences in Autobiographical Memory as a Function of Self-Construal

Autobiographical memory is intimately related to the concepts of identity and the self (Libby & Eibach, 2007). The self provides a person with a sense that he or she is a separate entity from other people (Neisser, 1988). As a result, a sense of self allows individuals to distinguish between their own experiences and other people's experiences. In this view, it is only after a person acquires a sense of self that he or she can start constructing autobiographical memories (Howe & Courage, 1993, 1997); in other words, the sense of self seen in infants can be seen as a precursor to acquiring autobiographical memories and hence, to developing a personal identity later in life through autobiographical narratives and life stories (Fivush, Habermas, Waters, & Zaman, 2011; Nelson & Fivush, 2004).

According to Markus and Kitayama (1991), there are cultural differences in the way individuals construct a sense of self in relation to others. Such differences can be described in terms of an independent self-construal and an interdependent self-construal. The mode of self-construal informs about the nature of the relationship between the self and others, specifically about how close or separate an individual feels from other individuals. The construal of the self as independent from others leads individuals to value autonomy, independence, individuality, uniqueness, and self-expression. Conversely, the construal of the self as interdependent from others leads individuals to value connectedness, social harmony, social status, collectivity, conformity to rules and to norms, and humility (see Jobson, 2009, for a detailed description). According to Markus and Kitayama (1991), independent selves are characteristic of individualistic societies (typically Western), while interdependent selves are characteristic of collectivistic societies (typically non-Western).

There is some evidence that these different modes of self-construal have significant impact on cognition and autobiographical memory (see Wang & Ross, 2007, for a review); specifically, on how early in life children develop autobiographical memories that can be retrieved later in life (Wang, Conway & Hou, 2007), how individuals remember and narrate personal life events (Ross & Wang, 2010; Wang & Brockmeier, 2002; Wang & Conway, 2004), how mothers share memories with their small children (Wang, Leichtman, & Davies, 2000) and how detailed and specific autobiographical memories are (Humphries & Jobson, 2012). For example, Wang and Conway (2004) asked Chinese and European American participants to recall 20 memories and to indicate, on a 5-point Likert scale, how personally important the recalled memories were. Their results showed that autobiographical memories were significantly more personally important for American than for Chinese participants.

Individuals with an interdependent self-construal whose life stories reflect social hierarchies and tight family relations might be highly affected by events directly experienced by other family members. Therefore, they might incorporate these events experienced by others as part of their own identities and life stories. For example, older individuals from collectivistic societies might consider the successes and failures of their children as their own successes and failures. A study conducted by Su and Hwang (2003) revealed that Chinese retirees rely on their children's professional success and moral standing as a means to "save face", rather than on their own achievements.

Cultural Differences in Remembering Highly Emotional Events and their Centrality to Identity and Life Story as a Function of Self-Enhancement

Another factor in which East Asian and Western cultures seem to differ regarding the self is in their tendency towards self-enhancement and self-criticism. Some evidence exists that individuals from East Asian cultures tend to hold more realistic self-views compared with

individuals from Western cultures; either due to reduced or totally absent self-enhancement (Heine & Hamamura, 2007) or due to increased self-criticism (Chang & Asakawa, 2003; Heine, 2001). Therefore, it may be the case that individuals from East Asian cultures are less inclined to perceive highly positive events as central to their self and identity, as compared with individuals from Western cultures. Of course, the reverse case might also be possible; individuals from East Asian cultures may be more inclined to perceive highly negative events as more central to identity and their self, compared with individuals from Western cultures. Furthermore, we believe that these distinct modes of self-enhancement tendencies may also affect the manner in which individuals remember and assign self-relevance to highly emotional positive and negative events. A study by Endo and Meijer (2004) showed that American participants remembered more successes than failures, while East Asian participants remembered almost the same number of successes as those of failures. Therefore, cultural differences in self-enhancement may influence autobiographical memory and event centrality.

Event Centrality as a Function of Emotional Distress, and Well-being Across Cultures

Although the relation between event centrality and emotional distress had not been studied cross-culturally, previous research provided some evidence that cultural differences in self-construal may interact with this relationship. Jobson and O’Kearney (2008) found more trauma-related goals and self-defining memories and thoughts in trauma survivors with PTSD as compared with those without PTSD. However, this difference was seen only in participants from individualistic cultures. A similar difference was not observed in trauma survivors from collectivistic cultures. According to these researchers, traumatic events seem to impact the identities of individuals with PTSD from different cultures in distinct ways (but see Jobson et al., 2014, for pan-cultural effects of trauma on self-defining memories, goals, and self-

statements as well as on expressions of autonomy and self-determination in autobiographical remembering). They also explained that such differences might result from the fact that the development of trauma-centered identities seems to be more culturally acceptable in individualistic societies, which place a higher value on discussing the individual's life story, personal identity, and uniqueness following trauma, compared with collectivistic societies. Interestingly, data from Jobson and O'Kearney (2008) did not reveal significant differences in the levels of PTSD symptoms between the PTSD group from the independent self-construal culture and the PTSD group from the interdependent self-construal one, even though these groups were significantly different in terms of trauma-related goals and self-defining memories. This suggests that the differences in the amount of trauma-related goals and self-defining memories between the two PTSD groups actually stem from cultural differences in the integration of traumatic events to identity instead of from differences in the severity of PTSD symptoms (but see Jobson et al., 2014).

The present study

The present study examined the relationship between event centrality and emotional distress and well-being in non-clinical samples from four different countries — Mexico, Greenland, China, and Denmark — representing both Western and East Asian cultures. We were interested in investigating whether findings from Berntsen et al. (2011) on the event centrality of positive and negative events observed in an American sample could be replicated across cultures; mainly (1) whether positive events are rated as more central to identity than negative events, and (2) whether the event centrality of negative events is positively related to symptoms of emotional distress whereas centrality of positive events is unrelated to such measures. Specifically, we were interested in the potential cultural differences in event centrality for positive and negative events and in the relation between event centrality and

emotional distress, possibly resulting from cultural differences in self-construal, and differing levels of emotional distress and well-being. In other words, we wanted to examine whether event centrality and its relationship to emotional distress and well-being varied as a function of the participants' cultural backgrounds. In order to investigate these potential cultural differences, we recruited participants from countries that can be characterized as being either Western societies (i.e., Denmark, Greenland and Mexico) or by representing an East Asian society (i.e., China), as characterized by Hofstede (1991), Hofstede, Hofstede and Minkov (2010), Markus and Kitayama (1991), and Nielsen (2001). Furthermore, these selected countries also vary in other important aspects, such as levels of happiness, geographical location, climate, religion, language, political and economical systems, and historical conditions (e.g., Helliwell & Wang, 2013).

The study addresses a critical gap in the literature by providing a cross-cultural examination of the centrality of highly positive versus negative events and by examining how this centrality varies as function of emotional distress and well-being across cultures. Although the participants recruited for the present study are drawn from non-clinical samples, the study helps to remedy the shortage of cultural considerations in current PTSD models that explore mechanisms that are regulated by the self (see Jobson, 2009; Jobson, Moradi, Rahimi-Movaghar, Conway, & Dalgleish, 2014).

Hypotheses and Predictions

Based on earlier event centrality research, we formulated the following hypotheses and predictions: (1) positive events will be rated as more central to participants' identity and life story compared with negative events; and (2) event centrality for negative events will be positively correlated with PTSD and depression symptoms whereas event centrality for positive events will not show such relations.

Hypotheses and predictions regarding cultural differences in the centrality of positive and negative events are less straightforward. As mentioned previously, two of the most relevant psychological processes linked to cultural differences in autobiographical memory are those concerned with the self, namely, self-construal and self-enhancement. We mainly rely on cultural differences on self-enhancement for our predictions as this concept is more related to emotion than that of self-construal. As such, our predictions are based on the distinction between Western and East Asian cultures, as most of the literature on self-enhancement is based on this dimension and it suggests that important cultural differences exist.

Because participants from East Asian cultures tend to self-enhance less and be more self-critical than participants from Western cultures, we predict that such tendencies might result in three possible scenarios, regarding the centrality of memories of the most positive and most negative life events: (1) either participants from our East Asian sample (i.e., China) will rate the positive event as less central to their identity and life story, (2) they will rate the negative event as more central to their identity and life story, compared to participants from our Western samples (i.e., Mexico, Greenland and Denmark, or (3) both (1) and (2) will be the case.

Method

Participants

A total of 598 adults over 40 years old were recruited in four countries: Mexico, Greenland, China, and Denmark. Of these, 33 participants were excluded from the sample because they failed to complete at least 95% of the total items in the survey. A final sample of 565 adults (365 females, 200 males), mean age = 52.31, $SD = 8.44$, age range: 40-91, was analyzed. See Table 1 for demographic information. Participants in Greenland received 100

DKK (equivalent to approximately 18 USD) for participating in the study. Participants in China received a public transportation card worth 200 CNY (equivalent to approximately 32 USD). Participants in Denmark received a gift certificate worth 100 DKK (equivalent to approximately 18 USD) for a local supermarket chain. Participants in Mexico received no compensation for their participation in the study, as there appeared to be no need to provide a monetary incentive for participation.

In Mexico, participants were recruited by local university students and by program coordinators, enrolled at and working at the University of Guadalajara and by psychologists at the local public psychological services provider in Guadalajara, Jalisco. In Greenland, participants were recruited by Greenlandic students enrolled at Aarhus University, in five different cities: Nuuk, Aaisaat, Illulissat, Qaqortoq, and Sisimiut. Recruitment was done through advertisements, radio public announcements, and local community services. In China, local university students enrolled at East China Normal University, in Shanghai, recruited participants. Recruitment was done through direct invitation. In Denmark, participants were recruited through posters, human resources offices, and direct invitation through e-mail or Facebook.

(Table 1)

Materials

Centrality of event scale - negative event (CES-Negative).

The CES-Negative (Berntsen & Rubin, 2006) is a self-report measure of the centrality of the most negative or traumatic event in someone's identity and life story. First, participants completed the sentence: "*The most negative or traumatic event of my life was ...*" with a brief label (e.g. "*when I had a car accident*"). Subsequently, they indicated how old they were

when the event occurred.² Finally, participants responded to seven items in which they indicated, on a 5-point Likert Scale, (1 for “totally disagree” and 5 for “totally agree”) the impact that the event has had in their lives (e.g., “*I feel that this event has become part of my identity*” and “*I feel that this event has become a central part of my life story*”). The mean rating score is reported. The score can range from 1 to 5 points. This scale was found to be highly reliable in all samples (7 items; $\alpha = .86 - .91$).

Centrality of event scale - positive event (CES-Positive).

The CES-Positive is adapted from the CES-Negative and addresses the centrality of the most positive event in someone’s identity and life story. First, participants completed the sentence: “*The most positive event of my life was ...*” with a brief label (e.g. “*when I graduated from college*”). Subsequently, they indicated how old they were when the event occurred.² Finally, participants responded to seven items in which they indicated, on a 5-point Likert Scale (1 for “totally disagree” and 5 for “totally agree”), the impact that the event has had in their lives (e.g., “*I feel that this event has become part of my identity*” and “*I feel that this event has become a central part of my life story*”). The mean rating score is reported. The score can range from 1 to 5 points. This scale was found to be reliable in all samples (7 items; $\alpha = .82 - .87$).

Center for epidemiologic studies depression scale (CES-D).

The CES-D (Radloff, 1977) is a self-report measure of depression in the general population. This scale consists of 20 items. Each item required the participant to indicate, on a 4-point Likert scale (0 for “rarely” and 3 for “all the time”), how often they felt a particular

² The lifespan distribution (according to age at event) and content of the memories of highly negative and positive life events across cultures will be reported elsewhere (Zaragoza Scherman, Salgado, Shao, & Berntsen, 2014).

way (e.g., “*I did not feel like eating; my appetite was poor*” and “*I felt that everything I did was an effort*”) during the previous week. The total sum score is reported. The score can range from 0 to 60 points. A total sum score of 16 points or above indicates clinical symptoms of depression. This scale was found to be reliable in all samples (20 items; $\alpha = .83 - .87$).

Post-traumatic stress disorder checklist -civilian (PCL-C).

The PCL-C (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Weathers et al. 1994) is a self-report measure of post-traumatic stress disorder symptoms in response to stressful life experiences from the past. It consists of 17 items, corresponding to the 17 symptoms of the PTSD diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000). Each item required the participants to indicate, on a 5-point Likert scale (1 for “not at all” and 5 for “extremely”), how much they have been bothered by a symptom, for example: “*having difficulty concentrating*” and “*trouble falling or staying asleep*”. The total sum score is reported. A total sum score of 36 points or more, in addition to responses above 3 in at least one of questions 1-5, three of questions 6-12 and two of questions 13-17 indicate clinical symptoms of PTSD. (National Center for PTSD, 2014). The score can range from 17 to 85 points. This scale was found to be highly reliable in all samples (17 items; $\alpha = .90 - .92$).

Satisfaction with life scale (SWLS).

The SWLS (Diener, Emmons, Larsen, & Griffin, 1985) is a self-report measure of life satisfaction as a component of well-being. The scale consists of five items. Participants indicated, on 7-point Likert scale (1 for “strongly disagree” and 7 for “strongly agree”), how satisfied they are with their lives (e.g., “*The conditions of my life are excellent*” and “*If I could live my life over, I would change almost nothing*”). The total sum score is reported. It can

range from 5 to 35 points, where 5-9 is extremely dissatisfied, 10-14 is dissatisfied, 15-19 is slightly below average, 20-24 is average, 25-29 is satisfied, and 30-35 is highly satisfied. This scale was found to be highly reliable in all samples (5 items; $\alpha = .85 - .92$).

Procedure

Prior to data collection, research assistants collecting data in Mexico, China, and Greenland received a training session in which they were given detailed instructions and a practice session on how to conduct data collection sessions and how to instruct participants to complete the survey. All participants answered the survey in their native language. We used methods of back-translation (Brislin, 1970) to ensure the quality of the translation process. In addition to the scales previously described, participants also provided demographic information, such as age, gender, and educational level. In Mexico, Greenland, and China, data were collected by research assistants at the participants' own home or workplace, at a psychological services provider office or at a community center. In data collection sessions, participants completed the questionnaires individually. Sessions consisted of one or more participants, but never more than 5 people. In the data collection sessions and after the research assistants gave them instructions; participants were given a booklet containing all materials. In the booklet, the measures appeared in the following order: CES-D (depression), PLC-C (PTSD), CES-Negative (event centrality of the most negative event), CES-Positive (event centrality of the most positive events), and SWLS (life satisfaction).

Once the participant finished answering the survey, the research assistants collected the booklet, thanked the participant and (if applicable) handed out their compensation for their participation. In Denmark, the survey was sent to the participants via regular mail, along with information about the research project and detailed instructions on how to complete the questionnaires. Once the survey was completed, participants sent it back to the experimenter

in a pre-paid envelope. In a separate envelope participants also sent their mailing address to receive their gift certificate. A gift certificate was sent by regular mail to those participants who provided their mailing address. Data reported here were part of a larger study that examined life script and life story events across cultures.

Results

First, we describe the cross-cultural differences in measures of PTSD and depression symptoms, and levels of life satisfaction. Second, we examine the differences in ratings for the centrality of both the most positive and most negative events across countries. Lastly, we explore the relationship between the centrality ratings and levels of emotional distress and life satisfaction measures. No gender differences were found in our measured variables; therefore, data for males and females were collapsed. Since the levels of education differed significantly across countries, $F(3,561) = 24.56, p < .001, \omega^2 = .33$, we controlled for this variable in relevant analyses, as explained later.

Levels of PTSD, Depression, and Life Satisfaction Across Countries

We conducted a series of One-Way ANOVAs to compare the mean scores of our emotional distress and life satisfaction dependent variables: PTSD, depression, and life satisfaction, across countries. All results were evaluated for significance at the level of .05. Table 2 shows means and standard deviations of these measures across countries and the results of the One-Way ANOVA analyses. We also conducted a series of One-Ways ANCOVAs to control for the level of education. The following section will examine each measure independently.

(Table 2)

The levels of PTSD symptoms were significantly different across countries (see Table 2). Tukey post-hoc analyses revealed that the Greenlandic participants exhibited significantly more PTSD symptoms than the Danish participants ($p < .001$). No other group differences were statistically significant. The effect of country on the level of PTSD symptoms remained significant after controlling for education $F(3,549) = 5.41, p < .05$. The percentage of participants who met the clinical cut-off for PTSD per sample was 12.59 (Greenland), 8.59 (Mexico), 6.38 (Denmark), and 6.00 (China).

The levels of depression symptoms were significantly different across countries (Table 2). Tukey post-hoc analyses revealed that the Chinese participants exhibited significantly more depression symptoms than the Danish participants ($p = .032$). No other group differences were statistically significant. However, the effect of country on the level of depression symptoms was not significant after controlling for education $F(3,539) = 1.52, p > .05$. The percentage of participants who met the clinical cut-off for depression per sample was 26.49 (China), 25.76 (Greenland), 21.49 (Mexico), and 16.43 (Denmark).

The levels of life satisfaction were significantly different across countries (Table 2). Tukey post-hoc analyses revealed that the Chinese participants showed significantly lower life satisfaction compared with Greenlandic ($p < .001$), Danish participants ($p < .001$), and Mexican participants ($p < .001$). No other group differences were statistically significant. The effect of country on the level of life satisfaction remained significant after controlling for education, $F(3,554) = 21.49, p < .05$. The percentage of participants who reported to be dissatisfied or extremely dissatisfied with their lives, per sample, was 35.95 (China), 13.85 (Mexico), 12.86 (Denmark), and 9.56 (Greenland).

Event Centrality for Positive and Negative Events Across Cultures

Consistent with the idea of a cross-cultural positivity bias, participants from all four

countries rated the most positive event as more central to their identity and life stories, compared with their most negative event, for which event centrality ratings varied across the four countries (Figure 1). In order to examine this relation statistically, we conducted a 2 Event Emotional Valence (CES-Positive vs. CES-Negative) x 4 Country of Origin (Mexico, Greenland, China, Denmark) repeated-measures factorial ANOVA. All results were evaluated for significance at the level of .05. This analysis showed a main effect of emotional valence, $F(1,552) = 504.13, p < .001, \eta_p^2 = 0.477$, reflecting higher event centrality ratings for the positive event. A main effect of country of origin was also found $F(3, 552) = 6.39, p < .001, \eta_p^2 = 0.034$, reflecting that participants from different countries assigned different centrality ratings to the negative event. Importantly, a significant interaction between the Event Emotional Valence \times Country of Origin, $F(3, 552) = 13.67, p < .001, \eta_p^2 = 0.069$ was found, reflecting that the participants' country of origin influenced the event centrality ratings for the most negative event, but not (or less so) for the most positive event.

(Figure 1)

In order to analyze the interaction effect in more detail, we conducted two One-Way ANOVAs with country as a grouping variable and CES-Negative and CES-Positive as the dependent variables, respectively. All results were evaluated for significance at the level of .05. In addition, we conducted an ANCOVA for the same two variables to control for the level of education. The CES-Negative scores were significantly different across countries, $F(3, 556) = 12.25, p < .001, \omega^2 = .24$ indicating that participants rated the centrality of the most negative events differently across the four countries (See Table 2 and Figure 1). Tukey post-hoc analysis revealed that Mexican participants rated their most negative event as being significantly less central to their identity and life story than Danish ($p = .009$), Chinese ($p <$

.001), and Greenlandic ($p = .003$) participants. At the same time, Chinese participants rated negative events as being significantly more central to their identity and life story compared with Greenlandic ($p = .024$) and Mexican ($p < .0001$) participants. No other group differences were found. The effect of country on the CES-Negative scores remained significant after controlling for education $F(3,555) = 11.12, p < .05$. The CES-Positive scores were uniformly high across countries, and did not differ significantly between countries, $F(3,557) = 0.75, p = .523, \omega^2 = .00$. This was counter to our prediction that the Chinese sample would view positive events as less central compared to the other countries. However, support for our alternative prediction regarding negative events being rated higher in the Chinese sample was supported, as noted above (See Figure 1). This seems to suggest that self-enhancement and self-criticism tendencies have an impact on the event centrality ratings of negative events, but not on the ratings of positive events. The effect of country on the CES-Positive scores remained non-significant after controlling for education $F(3,556) = 0.78, p > .05$.

Centrality for the Positive and Negative Event as a Function of Distress and Well-being

According to our predictions, individuals with more severe symptoms of emotional distress were expected to report higher event centrality scores for the most negative event, while individuals with higher well-being levels were expected to report lower event centrality scores for the most negative event. We expected centrality ratings of positive events to be unaffected by these factors (Berntsen et al., 2011).

The centrality of the positive and negative events as a function of distress and well-being showed a very consistent pattern across countries. First, individuals with higher and lower levels of emotional distress rated the centrality of the positive event uniformly high, across the four countries. Second, the centrality ratings of the negative event were higher with higher levels of emotional distress, whereas a similar association was generally not seen for

the centrality of the positive events.

A series of 2 (CES-Positive vs. CES-Negative) x 2 (higher vs. lower symptom severity group) repeated-measures factorial ANOVAs was conducted to examine how the centrality of the positive and negative event varied as a function of symptom severity (higher scores versus lower scores) for PTSD and depression in both the general sample and per country. A similar series of analysis was conducted for higher versus lower levels of life satisfaction (See Table 3). All results were evaluated for significance at the level of .05. Symptom severity and levels of life satisfaction groups (higher and lower) corresponded to a median-split grouping in order to ensure that both groups contained approximately the same number of participants, in both the general and per country analyses. Figures 2-4 illustrate the findings for each of the dependent variables, to be elaborated in the following sections.

(Table 3)

Post-traumatic Stress Disorder (PTSD) Symptoms

Figure 2 shows the centrality scores for the most negative and most positive events as a function of higher versus lower levels of PTSD symptoms, as well as the nature of the interactions, for the general sample and for each individual country. Table 3 displays the results of the statistical tests. It is shown that for the general sample, as well as for samples from all four countries, an interaction is seen between levels of symptom severity and the emotional valence of event. This means that consistent with our prediction, individuals with higher levels of PTSD symptoms rated negative events as significantly more central to their identity and life stories, compared with individuals with lower levels of PTSD symptoms ($p < .001$), while the ratings for positive events did not show a similar difference between individuals with higher and lower levels of PTSD symptoms ($p > .05$). Also across all four

countries, we found a main effect of the emotional valence of the event, reflecting the finding that the CES-positive generally was scored higher than the CES-negative for both the higher and lower symptoms groups, in all countries (Table 3).

(Figure 2)

Depression Symptoms

Figure 3 shows the centrality scores for the most negative and most positive events as a function of higher versus lower levels of depression symptoms, as well as the nature of the interaction for the general sample and each individual country. Again, the centrality of the positive event was higher than the centrality of the negative events for both symptom severity groups, as evinced by the main effect of event valence. For the Mexican and Greenlandic samples, as well as for the general sample, we found an interaction between the emotional valence of the event and higher versus lower depression symptoms. In the Greenlandic and general sample, this reflected that individuals with higher levels of depression symptoms rated negative events as significantly more central to their identity and life stories, compared with individuals with lower levels of depression symptoms (all $ps = .001$), while the ratings for positives events did not differ significantly between the two groups (all $ps > .13$). This interaction was not seen for the samples from China and Denmark (Table 3).

(Figure 3)

Life Satisfaction

Figure 4 shows the centrality scores for the most negative and most positive events as a function of higher versus lower levels of life satisfaction, as well as the nature of the

interactions. Once more, a main effect of the emotional valence of the event was found for all samples, reflecting uniformly higher centrality ratings for the positive event for both higher and lower life satisfaction groups. In addition, the general and the Greenlandic samples showed an interaction effect, reflecting that individuals who experienced higher levels of life satisfaction also considered the most negative event in their lives as less central to their identity and life story ($p < .05$); while a smaller reverse effect was seen for the centrality of the most positive event for the general sample ($p = .001$). Such interactions were not found in the other samples (see Table 3).

(Figure 4)

Discussion

The present study provides unique evidence concerning the centrality of positive and negative events across cultures and their relation to emotional distress and well-being. It thereby extends previous research on event centrality in novel and important ways. We showed that the emotional valence of highly emotional life events affects the extent to which individuals across different countries integrated these events into their identity and life story. We predicted and found that emotionally positive events were considered more central than were negative events. This pattern was found across all four countries and across higher versus lower levels of emotional distress and well-being. Also, following our predictions, in general, participants with higher levels of emotional distress rated their self-nominated most negative event as more central to their identity and life story, compared with participants with lower levels. This pattern was clearest for the levels of PTSD symptoms, where it was consistent across the four countries. It also tended to be seen for depression and life satisfaction, but not as consistently across countries. Finally, we showed a novel and interesting finding permitted only by the cross-cultural nature of this study: that is,

participants' centrality ratings of the most positive event showed no differences across countries, whereas event centrality ratings of the most negative event were significantly different across countries.

In the following sections we will discuss these findings in more details. We will begin by addressing the event centrality ratings for the positive events across cultures. Then, we will discuss how the event centrality of emotionally negative events varies as a function of emotional distress. Finally, we will discuss the event centrality ratings for the negative events across cultures.

Event Centrality for Positive Events Across Cultures

The uniformly high centrality for positive events was consistent with our predictions and has several possible explanations. First, the cultural life script (Berntsen & Rubin, 2004) might have functioned as a narrative framework in which positive events could be easily and readily integrated into identity and life stories. This might result from the fact that the most positive life events match our cultural expectations for a highly positive life as the cultural life script prescribes (see Berntsen & Rubin, 2004). Consistent with this possibility, when we analyzed the autobiographical content of the events, 78% of the most positive events were scripted life events, whereas this was the case for only 40% of the negative events (Zaragoza Scherman et al., 2014). Furthermore, adherence to the cultural life script could have led the participants to overestimate the centrality of their self-reported most positive event. Second, self-enhancement motivations might result in higher centrality ratings for the positive events in Western participants (Chang, 2008). However, East Asians did not show lower centrality ratings for the positive events, in contrast to our assumptions of reduced self-enhancement in the centrality ratings of highly emotional positive life events in the East Asian sample. However, because East Asian individuals tend to self-enhance less and self-criticize more,

they might have more realistic self-evaluations (see Heine & Hamamura, 2007; Hamamura & Heine, 2008; Heine, Lehman, Markus, & Kitayama, 1999). Therefore the effects of reduced self-enhancement may be seen in the centrality ratings of the negative event, as discussed later. Third, higher event centrality ratings for the most positive events could also reflect that these events simply were rehearsed more frequently (Walker, Skowronski, Gibbons, Vogl, & Ritchie, 2009). Finally, possibly positive events may have become more central to identity and life story, compared to negative events, as a result of the fading affect bias (Ritchie et al., 2006, 2014; Walker et al., 2003; Walker, Vogl, & Thompson, 1997). These explanations may supplement one another and are not mutually exclusive. More research is needed in order to clarify their relative importance in accounting for the findings.

Centrality for Negative Event as a Function of Distress and Well-being Across Cultures

The centrality of negative events to identity and life story has been found to vary with levels of emotional distress. Individuals with higher levels of PTSD and depression symptoms report higher centrality ratings for negative life events, compared with individuals with lower levels (e.g., Berntsen & Rubin, 2006; Berntsen et al., 2011; Boals, 2010; Brown et al., 2010; Rubin et al., 2008) showing that the centrality attributed to a negative event may hold important implications for an individual's mental health and psychological functioning. In the present study, we replicated this finding across cultures: Individuals whose most negative life event was more central to their identity and life stories tended to report experiencing more symptoms of PTSD and depression. Mood-dependent memory, in combination with rehearsal effects, also may help explain why individuals whose negative event was more central to their lives experienced more symptoms of PTSD and depression. According to several studies (Eich & Forgas, 2003; Eich & Schooler, 2000; Kihlstrom et al., 2000; Taylor, 1991; Watkins, 2002) individuals with depression tend to retrieve more negative information than individuals

with no depression. For individuals with emotional distress, higher rates of retrieval of negative memories would increase rehearsal, and therefore, contribute to higher event centrality of these highly rehearsed negative events. The fact that we find this pattern across cultures underscores the robustness of the effect.

Event Centrality for Negative Events Across Cultures

The centrality ratings of the most positive events did not differ across countries, whereas the centrality of the most negative events did. Such cross-cultural differences of the centrality ratings of negative events can be explained in several ways. The first and most intuitive explanation would be that higher levels of PTSD and depression correspond to higher centrality ratings of the most negative event; in such explanation, the countries with the highest centrality of negative events would also show the highest levels of emotional distress. However, we did not find this to be the case. The different centrality ratings of the negative events were not simply explained as a result of different levels of emotional distress across the four countries, because these followed a different pattern. For example, the sample from Mexico had the lowest centrality score for the negative event, but did not show lower levels of PTSD and/or depression symptoms compared to the remaining three countries.

A second explanation could be related to the nature (i.e., “content”: what the event was about), the prevalence, and severity of the negative events. It would be intuitive to imagine that more horrific, more prevalent, and more severe events have a greater potential to become highly central to identity and life story, compared to less severe events, and also that the prevalence of such experiences would vary across cultures, for example as a consequence of the cultural revolution in China in the 70’s or the social problems in Greenland. However, if so, one might expect this to affect the level of PTSD symptoms concordantly, which was not the case.

A third potential explanation corresponds to cultural differences in the self. It is possible that the cross-cultural variability in the centrality ratings for the negative events may be an expression of differences in self-enhancement or self-criticism. Chinese participants might be more sensitive to heightened self-criticism when they appraise how self-relevant highly emotional life events are. We suggest that the fact that the Chinese sample had the highest centrality rating for the most negative events may reflect such heightened self-criticism. This would be consistent with studies that have demonstrated that East Asian individuals favor self-criticism, rather than self-enhancement, as a means for self-improvement (Hamamura & Heine, 2008).

Fourth, there might be other variables sensitive to cultural differences, such as the fading affect bias (Walker et al. 1997), that influence how highly emotional events are constructed and recalled. Although Ritchie et al. (2014) found a fading effect bias in samples from six countries, these were mostly Western. Furthermore, the functions of autobiographical memory differ according to the valence of the memory: negative memories often have a directive function, whereas positive memories are more likely to cover self- and social functions (Rasmussen & Berntsen, 2009). Therefore, cross-cultural differences in these functions could also be relevant to account for the differing centrality ratings of negative events, across cultures. According to Wang and Coway (2004), Chinese participants often use the directive function of autobiographical memories.

Potential Limitations

A potential limitation of the study is that our sample only included participants over 40 years old. However, because one of the objectives was to replicate findings from Berntsen et al. (2011), the choice on the sample seems justified. Another limitation was the lack of complete matching of level of education across the four cultural samples. Still, cultural

differences were seen on the key variables also when controlling for this variability in level of education. Despite these potential limitations, this study contributes significantly to the event centrality literature by comparing the event centrality of highly emotional events, within adult community samples, across cultures. We believe it is important to investigate autobiographical memory phenomena across cultures. Otherwise, the field may suffer from a partial view of the phenomenon by looking only at Western samples of convenience (i.e., undergraduate psychology students).

Conclusions

Using samples from four countries, representing both Western and East-Asian cultures, we investigated the relationship between event centrality, emotional distress, and well-being, across cultures, thus helping to fill a critical gap in the literature. Results showed that across samples, positive events were rated as more central to identity and life stories than negative events. The centrality of negative events differed across cultures, whereas the centrality of positive events did not. High centrality of the most negative events was positively related to symptoms of PTSD and depression, and negatively related to life satisfaction. Conversely, the centrality of positive life events was positively related only to levels of life satisfaction, but unrelated to levels of symptoms of PTSD or depression. Thus, only the centrality of the most negative life event was systematically associated with measures of emotional distress and well-being across cultures. Taken together the findings suggest that highly positive and negative life events become central to identity and life story through different mechanisms and that this difference replicates across cultures

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Table 1. Demographics of participants in the final sample for each country

	Sample size	Females %	Age				Years of Education	
			Mean	SD	Min	Max	Mean	SD
General	565	64.60	52.31	8.44	40	91	14.39	3.25
Mexico	132	70.45	51.15	8.87	40	91	14.30	3.45
Greenland	137	62.77	50.56	6.82	40	74	14.54	2.95
China	154	58.44	50.88	7.16	40	79	12.90	3.21
Denmark	142	67.61	56.57	9.26	40	80	15.94	2.58

Table 2. One-way ANOVAs across all participants from the four countries for measures of emotional distress and well-being

	Mexico			Greenland			China			Denmark			F	ω^2
	N	M	SD	N	M	SD	N	M	SD	N	M	SD		
PTSD	128	28.20	9.94	135	30.83	10.27	150	28.31	8.94	141	25.87	9.00	6.23**	.17
Depression	121	10.88	7.81	132	12.04	8.82	151	12.17	7.71	140	9.61	7.46	3.16*	.11
Life Satisfaction	130	26.52	6.34	136	28.14	6.32	153	22.04	6.77	140	27.06	6.68	24.94**	.34

* Significant at level .05

**Significant at level .01

Table 3. Repeated-measures Factorial ANOVAs CES-Positive and CES Negative as a Function of PTSD, depression and life satisfaction

	PTSD						Depression						Life Satisfaction					
	Main Effects			Interaction			Main Effects			Interaction			Main Effects		Interaction			
	Symptom Severity Higher vs Lower	CES Valence Negative and Positive	Symptom Severity * CES Valence	Symptom Severity Higher vs Lower	CES Valence Negative and Positive	Symptom Severity * CES Valence	Symptom Severity Higher vs Lower	CES Valence Negative and Positive	Symptom Severity * CES Valence	Symptom Severity Higher vs Lower	CES Valence Negative and Positive	Symptom Severity * CES Valence	Symptom Severity Higher vs Lower	CES Valence Negative and Positive	Symptom Severity * CES Valence			
F	η^2_p	F	η^2_p	F	η^2_p	F	η^2_p	F	η^2_p	F	η^2_p	F	η^2_p	F	η^2_p			
General	14.97**	0.03	460.77**	0.46	25.68**	0.05	4.28*	0.01	438.63**	0.45	18.16**	0.03	1.06	0.00	487.16**	0.47	24.22**	0.04
Mexico	6.84*	0.05	217.08**	0.64	6.84*	0.05	1.89	0.02	193.17**	0.63	4.38*	0.04	0.23	0.00	205.64**	0.63	3.76	0.03
Greenland	0.86	0.01	158.75**	0.54	4.85*	0.03	6.72*	0.05	169.94**	0.57	9.84**	0.07	1.16	0.01	172.93**	0.56	13.31**	0.09
China	3.37	0.02	44.51**	0.23	6.33*	0.04	0.41	0.00	51.68**	0.26	1.00	0.01	3.08	0.02	55.13**	0.27	3.69	0.02
Denmark	4.57*	0.03	108.58**	0.44	5.24*	0.04	0.13	0.00	102.74**	0.43	0.46	0.00	0.02	0.00	109.36**	0.45	2.64	0.02

*Significant at level .05

**Significant at level .01

Figure Captions

Figure 1 Mean event centrality scores for the most positive and most negative events, across countries. Error bars represent standard errors.

Figure 2. Mean scores on the CES-negative and CES-positive as a function of PCL-C scores, across countries. Error bars represent standard errors.

Figure 3. Mean scores on the CES-negative and CES-positive as a function of CES-D scores, across countries. Error bars represent standard errors.

Figure 4. Mean scores on the CES-negative and CES-positive as a function of SWLS scores, across countries. Error bars represent standard errors.