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# The effects of collective and personal transitions on the organization and contents of autobiographical memory in older Chinese adults

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**Abstract** Life transitions like war, marriage, and immigration presumably organize autobiographical memory. Yet little is known about how the magnitude of a given transition affects this mnemonic impact. To examine this issue, we collected (a) word-cued events, (b) event-dating protocols, (c) personally important events, and (d) transitional impact scores of the Cultural Revolution (1966–1976) and important events from Chinese adults who had been adolescents during the revolution. There were three main findings. First, *rusticated* participants, who moved from cities to rural areas during the Cultural Revolution, dated autobiographical memories in relation to this collective transition more frequently than *nonrusticated* participants, with the former group reporting a greater material (but not psychological) change in their lives due to this collective transition than the latter group. Second, material change predicted the degree to which the self-nominated important events served as temporal landmarks in event dating. Third, we observed that the events that people typically considered important and those that typically served as temporal landmarks changed as a function of age but displayed the similar temporal distributions. We conclude by considering the theoretical implications of these findings.

**Keywords** Autobiographical memory · Cultural Revolution · Event dating · Important memory · Transition theory

In the context of autobiographical memory research, a *transition* is an event or a set of events that causes a significant and enduring change in the fabric of life—in what people do, where they do it, and with whom (Brown, 2016; Brown, Hansen, Lee, Vanderveen, & Conrad, 2012). Several studies have documented the mnemonic importance of transitions (Bohn & Habermas, 2015; Brown, Schweickart, & Svob, 2016; Enz, Pillemer, & Johnson, 2016; Shi & Brown, 2016; Uzer & Brown, 2015; Zebian & Brown, 2014). In particular, they demonstrated that (a) transitions are often used as temporal landmarks when people attempt to date personal events, and (b) memorable personal events tend to "pile up" around transitional events. In combination, these findings suggest that transitions delineate major lifetime periods and thus play a central role in organizing autobiographical memory (Brown, 2016; Brown et al., 2012; Brown et al., 2016; also see Conway & Haque, 1999).

An examination of the types of events that serve as transitions suggests that they differ along several dimensions. We focus on three of them here. First, there is *scope*—the number of individuals whose lives are affected by a given transition. At one end of the continuum are transitions that affect a single individual; at the other are *collective transitions* (Brown et al., 2016), which affect entire societies; in the middle are transitions that affect small groups or cohorts. A second dimension is *normativity*—the degree to which a given transition is likely to occur in the lives of individuals who live in a society. An extensive literature documents a class of transitions, usually referred to as *life-script* events or *life-script-consistent transitions*, that are expected to occur in the lives of most people and to do so at a predictable time in the life span, such

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as marriage, having children, and starting a first job (Berntsen & Rubin, 2004; Rubin & Berntsen, 2003). There are also transitions that are unexpected, uncommon, and/or temporally unpredictable. We refer to these as *script-divergent transitions,* such as unemployment, relocation, and winning a lottery. The final dimension of interest is *impact*. Some transitions change everything, whereas others alter some aspects of a person's life but leave many unchanged.

According to transition theory (Brown, 2016; Brown et al., 2016; Shi & Brown, 2016), the organizational importance of a particular transition reflects its impact, independent of its scope (collective vs. personal) or its normativity (script-consistent vs. script-divergent). The present study was designed, in part, to investigate this claim by examining the extent to which older Chinese adults refer to a historical event, the Cultural Revolution, a collective transition, when dating their autobiographical memories. We also collected data concerning the nature, frequency, and importance of script-consistent and script-divergent transitions to investigate how these two types of transitions influence the organization of autobiographical memory.

Our sample consisted of Chinese adults who were old enough to have lived through an important collective transition (Cultural Revolution) and to have experienced a fair number of script-consistent and script-divergent transitions. The tasks, which are described in detail below, include event dating (which provides information about the organization of autobiographical memory; Brown et al., 2016) and the retrieval and rating of important life events.

The Cultural Revolution was a government-supported movement intended to purge China of prerevolutionary (i.e., non-Maoist) ideas, artifacts, and modes of behaviors (Meisner, 1999). Consistent with these aims, the effects of the revolution were widespread, varied, and in some cases, long-lasting. We were interested in the Cultural Revolution for two reasons. First, although it had a tumultuous, even violent, aspect to it, the Cultural Revolution was far less destructive than the conflicts we have examined in the past (e.g., World War II, the civil wars in Bosnia and Lebanon; Bohn & Habermas, 2015; Brown, 2016; Brown et al., 2009; Zebian & Brown, 2014). Second, and of particular relevance here, there was a policy that compelled many urban youth to work as laborers on agricultural communes for extended periods of time (Bonnin & Horko, 2013). As it turned out, some of the individuals who took part in this study had been rusticated; others had not. Thus, we were able to examine the effects of a very turbulent period in recent Chinese history on the memories of people whose lives were or were not dramatically altered by it.

The current experiment consisted of four phases. The tasks used in the first two were used in the past studies to document the existence of historically-defined autobiographical periods, to identify their enabling conditions, and to determine whether historical factors influence the temporal distribution of memorable personal events (e.g., Brown et al., 2009, 2016; Zebian & Brown, 2014). Phase 1 employed a standard cueing task that requires participants to recall specific autobiographical memories in response to cue words (Crovitz & Schiffman, 1974). In Phase 2, they thought aloud as they estimated when (the year and month) each of the recalled events happened. In Phase 3, we collected information about the type of experiences older Chinese considered personally important and determined whether these events were script-consistent, script-divergent, or both. During this phase, participants recalled the 10 most important events in their lives, indicated when each took place, rated their valence, and specified the amount and the nature of change produced by each. Finally, in Phase 4, all participants completed the 12-item Transitional Impact Scale (Svob, Brown, Reddon, Uzer, & Lee, 2014). These data were used to determine whether the participants experienced the Cultural Revolution as a major life transition and to document possible differences in the impact of the revolution on rusticated and nonrusticated individuals.

This sample and these tasks made it possible to address several issues. One concerned the Living-in-History effect. The Living-in-History effect is defined as the tendency for people to reference public events and historical periods when dating mundane personal events (Brown et al., 2009). This effect has been reliably observed in individuals who have survived wars (e.g., the civil war in Bosnia) and major natural disasters (e.g., the 1999 earthquake in Izmit, Turkey; Brown et al., 2009), but not otherwise. When it is observed, it is assumed that the frequently mentioned historical event served as a major collective transition, one that put an end to one way of life and ushered another, and did so without regard to the age, sex, or social status of the individuals involved.

At the outset of this study, we considered three possible outcomes with respect to the Living-in-History effect. One possibility was that there would be no effect. As mentioned above, the Living-in-History effect has been observed only in the wake of calamitous upheaval. Those studies have also demonstrated that the Living-in-History effect is unrelated to historical importance per se. For example, there was no evidence for a Living-in-History effect for the attacks of 9/11 in a sample collected from New Yorkers in 2004 (Brown et al., 2009). Likewise, the fall of Soviet Union was barely mentioned in data collected in Russia, Azerbaijan, or Uzbekistan (Nourkova & Brown, 2015). Thus, despite its historical significance, the fact that the Cultural Revolution did not lead to a total collapse of civil society suggests that it may not have served as a collective transition and hence that it would rarely be mentioned in the dating protocols.

The second possibility was that participants would often mention the Cultural Revolution and that this would be true regardless of whether they were rusticated or not. This prediction was based on the fact that the Cultural Revolution was intended to permeate many aspects of people's daily lives, and

its effects were, in fact, pervasive and long-lasting (e.g., Jennings & Zhang, 2005; Zhou & Hou, 1999). For example, virtually all city-dwelling individuals who were in their teens at the outset of the revolution were affected because secondary schools were closed for years. As a result, many students could not graduate and most could not find jobs in urban areas.

A third possibility was that the Living-in-History effect might be present, but only in the rusticated group. This would be consistent with the claims that (a) the Living-in-History effect is graded (Brown & Lee, 2010)—that is, it can appear in some segments of a population but not others—and that (b) the presence or absence of a Living-in-History effect is a reflection of the impact that a given historical event has had on the lives of people in the specified group. The graded nature of the Living-in-History effect has been observed several times. For example, WWII-generation Germans who had spent the war years in Berlin displayed a much stronger effect than their counterparts who had spent the war years in a small town in northern Germany (26% vs. 16% of memories being dated in relation to the war; Bohn & Habermas, 2015). Likewise there were more references to the Lebanese Civil War in protocols collected in Beirut (27%), the war's main battle ground, than those collected in the Bi'qa region (14%), some 30 kilometers to the east (Zebian & Brown, 2014). There were also more references to the 1999 Izmit earthquake when data were collected in Izmit (14%) than when they were collected in Ankara (0.3%), which lies about 250 kilometers away (Brown et al., 2009).

In addition, some studies have demonstrated a strong immigration or relocation effect (e.g., Schrauf & Rubin, 1998; Shi & Brown, 2016). For example, Zebian and Brown (2014) reported that individuals who relocated during the civil war displayed a stronger Living-in-History effect than those who did not. Enz et al. (2016) found that freely recalled autobiographical memories tended to pile up around city-to-city moves. Taken together, these findings suggested that the Living-in-History effect is likely to be stronger in the rusticated group than the nonrusticated group because the Cultural Revolution dramatically altered the living circumstances of the rusticated individuals but may not have affected the lives of nonrusticated individuals to the same extent.

Clearly, these predictions make different assumptions about the transitional impact of the Cultural Revolution on the lives of the people who lived through it; the ratings provided by the Transitional Impact Scale allowed us to test these assumptions. The transition theory assumes that transitions affect memory to the degree that they change a person's material circumstances. Thus, if the Living-in-History effect is strong and present in both groups, both groups should provide high ratings for material change; if the Living-in-History effect is weak or absent in both groups, the ratings should be moderate or low. Finally, if the rusticated group displays the Living-in-History effect and the nonrusticated group does not, the former should indicate that they experience more material change than the latter. Because psychological change often correlates with material change (Svob et al., 2014), it seemed possible, but not essential, that the former would follow the latter in this study.

In the third phase of this experiment, participants were asked to recall, date, and rate the 10 most important events in their lives. These data made it possible to assess the nature and temporal distribution of self-nominated important events. Specifically, we expected that the set of important events would include a mixture of script-consistent and script-divergent events and that the Cultural Revolution and other noteworthy public events might also be included (e.g., Bernstein, Nourkova, & Loftus, 2011; Glück & Bluck, 2007). We also expected that the script-consistent events would tend to have occurred during young adulthood and that script-divergent events would be spread more or less evenly across the life span (e.g., Bohn & Berntsen, 2011; Rubin & Berntsen, 2003; Schroots & Assink, 2005). These data enabled us to test the general notion that people use important life transitions as temporal landmarks (Brown et al., 2016; Shum, 1998). If this is true, we should find that many events listed in Phase 3 would also be mentioned in the dating protocols collected in Phase 2 and that ratings associated with the Phase-3 events might predict the frequency of Phase-2 references.

## Present study

To recapitulate, we examined the effects of collective and personal transitions on the contents and organization of autobiographical memory in older Chinese adults. First, we examined the possibility that the Cultural Revolution serves to structure the autobiographical memories of these individuals. Specifically, we compared how frequently rusticated and nonrusticated individuals mentioned the Cultural Revolution when dating personal memories and collected ratings that allowed us to gauge transitional impact of the event. Second, we categorized the script-consistent and script-divergent transitions experienced by our participants and examined how these personal transitions organized autobiographical memories. To this end, we asked the participants to report and rate the most personally important events in their lives; we then tested the prediction that the transitional impact of an event would be related to its use as a temporal landmark in event dating.

## Method

### Participants

All participants were recruited via advertisement and voluntarily took part in this study. In the advertisement, we explained that the interview was designed to assess the memory

characteristics of older adults and to learn how they remembered their past. We did not mention rustication in the advertisement because we aimed not to bias our sample or impact participants' later performance by highlighting the Cultural Revolution.

Fifty-three older Chinese in Beijing, China, were recruited. All signed the consent form at the beginning and were debriefed and paid at the end. Seven dropped out after the first two phases of the experiment. However, statistical conclusions concerning the distribution and dating of recalled events are the same regardless of whether we included or excluded these individuals from our analyses. Moreover, there were no significant differences in the age, sex, or education level between the seven participants who dropped out and the 46 participants who completed all the tasks. Data from the 46 older adults were included in the following analyses (22 males, age $M$ = 64.35, $SD$ = 5.34, range: 53–75; age when Cultural Revolution began in 1966, $M$ = 15.35, $SD$ = 5.38). Their mean years of residence in Beijing was 56.26 ($SD$ = 14.90, range: 5–71) and mean years of education was 12.00 ($SD$ = 3.37, range: 3–16). Fifteen reported that they left Beijing and lived and worked in rural areas because of the Cultural Revolution (age $M$ = 65.60, $SD$ = 4.55; age when Cultural Revolution began in 1966, $M$ = 16.67, $SD$ = 4.50). On average, these individuals were rusticated for 9.20 years ($SD$ = 7.30, range: 2–25). The remaining 31 participants did not report any rusticated experience (age $M$ = 63.74, $SD$ = 5.66; age when Cultural Revolution began in 1966, $M$ = 14.71, $SD$ = 5.72). Participants took about 90 minutes to complete the study, and each received 100 CNY as monetary compensation. They were interviewed individually in their homes or a quiet office in their communities. The data were collected in Beijing in July and August, 2015.

## Procedure and materials

The study consisted of four phases. In Phase 1, participants saw 20 cue words naming common objects (*automobile, bag, ball, book, box, bread, chair, coat, dog, pencil, piano, pill, radio, river, snow, spoon, stone, street, tree,* and *window*). One reason for using this set of cue words was to maximize the number of retrieved memories. It is well known that object terms are more effective cues than abstract nouns or emotion terms (Conway & Bekerian, 1987; Larsen & Plunkett, 1987; Robinson, 1976; Uzer, Lee, & Brown, 2012). But there were other reasons as well. First, the Living-in-History project has involved data collection in different countries and languages and intended to target a wide variety of historical events and personal transitions. Given this plan, we decided to use a single set of cue words to facilitate cross-sample comparison. In addition, we settled on neutral terms rather than leading terms (e.g., *tractor, hoe*, in China; *tower, box cutter* in the U.S.) because we did not want to bias participants to retrieve events from one (historical) period in preference to others. [1]

The cue words were printed on separate index cards and were presented one at a time in a unique random order. Participants responded to each cue word by orally reporting a specific, cue-related, and personal event that happened any time before last week. They were instructed that a specific event were ones that took place at a specific time and place, that occurred only once, and that lasted no longer than a day. When participants could not come up with an event, the cue word was presented again at the end of the phase. Before proceeding to the next cue word, the researcher repeated the participants' response back to him or her in the form of a brief sentence. This brief sentence referred to the participant him- or herself (e.g., "you"), included or clearly implied the word itself (e.g., *car* or *it*), and excluded any information on time or place that might have been mentioned in the word-cued responses. This sentence was then written on an index card by the researcher.

In Phase 2, participants saw the 20 words again in a random order and were reminded of the events that they recalled in the first phase. They reported when (i.e., which year) each event occurred and justified the date estimates. If participants simply provided a date, say 2000, or responded by talking about the event but did not mention a reason that justified the year given in the response, they were asked: "How did you decide that this event happened in 2000?", or "How did you decide that this event happened 15 years ago?". For each participant, the order of 20 words was randomized in both Phases 1 and 2. However, the first two words were for practice and always in the same order*: automobile* (first) and *chair* (second). Participants had no difficulty following instructions with the two practice words, and therefore these memories cued by the two practice words were included in the data. The pattern of results remained the same when the memories cued by the two practice words were excluded. Participants' responses in both phases were recorded on a portable, digital recorder.

In Phase 3, participants completed the important-events task, during which they recalled their most personally important events or experiences. Participants were asked to produce 10 events if possible, but they were also informed that they could produce fewer than 10 if they could not come up 10 important events. They were not specifically asked to include or exclude public events. Each of the recalled events was dated (relative to the participants' age when it happened) and rated for emotional valence and transitional impact.

[1] We note that we do not have access to Chinese norms validating the assumed neutrality of these terms, nor can we assert with any certainty that there were no between-group differences in subjective evaluation of these terms. We agree that it would be preferable to have access to such norms. However, it may well be impossible to control valence across groups if individuals in one group have experienced many years of hardship and individuals in another have not.

Specifically, the valence of each event was assessed using a 5-point scale (1 = *extremely negative*; 5 = *extremely positive*). Similarly, a 5-point scale (1 = *a little*; 5 = *a lot*) was used to indicate the degree of material change and psychological change brought about by the event in question. The psychological-change and material-change questions were worded as follows: "To what degree has this event changed you psychologically, including attitudes, the way you thought about things, understanding of right and wrong, or sense of self?" and "To what degree has this event changed your external material circumstances, including the places where you spent time, the activities you engaged in, or the people you spent time with?".

Phase 4 was concerned with whether the Cultural Revolution affected the lives of our participants. We addressed this issue by having them complete the 12-item Transitional Impact Scale (Svob et al., 2014). Six items in the scale measured the magnitude of material change (e.g., "Cultural Revolution has changed the places where I spend time", "Cultural Revolution has changed the people I spend time with") and the other six items measured the magnitude of psychological change (e.g., "Cultural Revolution has changed the way I think about things", "Cultural Revolution has changed my sense of self"). All items in the scale were read to the participants who rated their degree of agreement with each statement on a 5-point scale (1 = *completely disagree*; 5 = *completely agree*). Cronbach's alpha of this scale was high in the current study: .89 for material change and .88 for psychological change. After completing four phases, participants were asked whether they had any experience of rustication during the Cultural Revolution, and if yes, they reported the duration of rustication.

### Content coding of dating protocols

The coding involved two stages. During the first stage, we assessed the acceptability of the word-cued memories collected in Phase 1. A memory was considered acceptable only when it (a) was directly related to the cue word that elicited it, (b) happened at a specific time and place, (c) occurred in participant's own life, (d) lasted no longer than a day, and (e) happened at least 7 days prior to the interview. Out of all 920 word-cued memories collected, 827 (90%) events were judged as acceptable.

The second stage focused on the dating protocols elicited by the acceptable event memories. First, we decided whether a protocol was justified. Protocols were considered unjustified when participants estimated the dates by guessing or direct retrieval or simply describing the event again. After screening out unjustified responses, 770 autobiographical events and their dating protocols left. There was no significant difference in the number of justified protocols between the rusticated and non-rusticated groups ($M_{\text{rusticated}}$ = 17.27, $SD_{\text{rusticated}}$ = 1.10, $M_{\text{nonrusticated}}$ = 16.48, $SD_{\text{nonrusticated}}$ = 2.41, $p > .10$).

The justified protocols were assigned to one of the six categories (see Table 1). Protocols were assigned to the *historical* category when they included (a) references to the Cultural Revolution or other political movements that were directly related to the revolution and happened during the 10-year turbulence (e.g., Rustication Movement), and (b) references to other significant public events in China (e.g., Tangshan Earthquake in 1976). The script-consistent category included references to conventional and normative transitions recorded in a cultural life script (e.g., Bohn & Habermas, 2015). We identified the following personal transitions belonging to script-consistent category: college or educational experiences, marriage, child's birth, first job, grandchild's birth, death of close family member (e.g., parent or spouse), and retirement. Each of the script-consistent events accounted for more than 1% of the dating protocols in the rusticated or the nonrusticated group. These were common and key script-consistent transitions reported in the life scripts of different countries across cultures (Ottsen & Berntsen, 2014; Zaragoza Scherman, Salgado, Shao, & Berntsen, 2017), such as Japan (Janssen, Uemiya, & Naka, 2014), Qatar (Ottsen & Berntsen, 2014), and Germany (Hatiboğlu & Habermas, 2015). These events also appeared in an unpublished life script of China that we obtained in our laboratory. In contrast to the script-consistent category, the *script-divergent* category included references to non-normative transitions. We identified four types of script-divergent references, each of which accounted for more than 1% in the dating protocols of the rusticated or the non-rusticated group; i.e., move to another community, move to another city, job change, and serious disease/injury.[2]

The *personal/generic* category included references that did not fall into the script-consistent or script-divergent categories and that involved information specific to the participant's life, general temporally relevant knowledge, or both. The *relational* category included references to others' life transitions; the most frequently mentioned others were close family members, friends, and siblings. We identified four types of events belonging to the relational category: others' script-consistent transitions; others' script-divergent transitions; others' birth or death, excluding references to birth of child/grandchild or death of parent/spouse that should belong to script-consistent rather than relational category; and others' age or developmental status, including mixed temporal references that combine others' age, birth, and study or work status.

[2] A few of these script-divergent events may appear in some life scripts (e.g., "illness" came up in a life script reported by Janssen and Rubin, 2011), but none of them was part of the life scripts across different cultures (Ottsen & Berntsen, 2014; Zaragoza Scherman et al., 2017). Also, none of them constituted prominent portion in the Chinese life script we obtained.

**Table 1** Examples of word-cued events, dating protocols, and assigned response categories

| Cue | Word-cued event | Dating protocol | Response category |
|---|---|---|---|
| Bread | My mother taught me how to make bread. | I was about 16 years old at that time . . . secondary school . . .we didn't need to study. . . . It was during the Cultural Revolution . . . idle time . . . | *Historical*: Cultural Revolution |
| Coat | I received a green coat, a really fashionable one at that time. . . . They told me it's free and I was really delighted . . . but it finally turned out they charged for it . . . | The year 1969, in August, when I left Beijing, went to the Northeast China. . . . Rusticated Movement. . . . I was an "educated youth," sent to rural areas . . . that's why they gave us a coat. | *Historical*: Cultural Revolution |
| Spoon | We moved to a small apartment . . . no furniture, no spoons or bowls. We bought new ones. | My daughter was about 1-year-old . . . it was the year I gave birth to my son . . . | *Script-consistent*: Child's birth |
| Dog | My dog was lost at the night before Lunar New Year. People set off fire crackers. My dog was scared and ran away. I can't find him again. | 2010, five years ago, before I moved here. I remember I walked my dog at my previous community. . . . Too heart-broken to raise a dog since then. | *Script-divergent*: Move to another community |
| Chair | I bought a chair and put it on the back seat of my bicycle. The chair fell on my way home and I asked for a string from a nearby shop . . . | Before my son got married. . . . I bought a chair because my daughter-in-law, my son's girlfriend at that time, planned to visit us. . . . He got married in 1998, so that should be a few months earlier. | *Relational*: Child's marriage |
| Pencil | My daughter and I distributed pencils to friends and neighbors. I remembered we had lots of pencils. | My daughter graduated from university . . . an activity part of her graduation. . . . It's 1996. | *Relational*: Child's graduation |

Finally, the *pop/sports/weather* category included references to a unique popular cultural event, a specific sports event, or an extreme or unusual weather occurrence.

Following previous studies (Bohn & Habermas, 2015; Brown et al., 2009), if dating protocols contained references to the historical category as well as to other categories, these protocols were always coded as historical. The same procedure was used if event memories were dated in reference to the script-consistent or script-divergent category. If dating protocols contained references to both script-consistent and script-divergent categories, the category that seemed most dominant was chosen; otherwise, these protocols were coded as script-consistent. If dating protocols contained references to personal/generic category as well as relational category, the category that seemed most dominant was chosen; otherwise, these protocols were coded as personal/generic. Two independent coders assigned the dating protocols to one of the aforementioned categories. One coder scored all the dating protocols, and the other coder scored 209 dating protocols from 12 randomly selected participants. They agreed on 92.3% of the dating protocols, with Cohen's kappa = .85, $p < .001$, 95% confidence interval (CI) [.78, .92].

### Content coding of important events

The important-events task generated 373 autobiographical events, events that participants considered the most personally important events in their lives. We discarded seven events because they lasted for more than 1 year. We coded the Cultural Revolution as a historical category when participants directly cited it as an important event and/or described a specific encounter that was directly related to the revolution and occurred during the revolution. Similarly, we coded important events into the other-historical category when participants directly cited other public events as personally important events, and/or described a specific encounter that is directly related to a public event and occurred during the public event. Based on the transitions identified in the dating protocols that belonged to the script-consistent and script-divergent categories, we coded the same categories of transitions in the important events. Specifically, the script-consistent category of important events comprised college or educational experiences, marriage, child's birth, first job, grandchild's birth, death of close family member, and retirement. The script-divergent category of important events comprised move to another community, move to another city, job change, and serious disease/injury. In addition, an important event was coded into the relational category when a participant reported a family member's script-consistent or script-divergent transition, or reported a relationship with a specific person (e.g., teacher, sibling), as a personally important event. The content analysis of the remaining important events that did not belong to historical, script-consistent, script-divergent, or relational category was open-ended and not restricted to categories identified in previous studies. We retained categories of important events cited by at

least two participants and folded all other important events into an "other" category (similar to the procedure used by Koppel & Berntsen, 2016). An initial coder generated categories of important events and a second independent coder coded 85 important events from 12 randomly selected participants. They agreed on 94.1% of the important events with Cohen's kappa = .88, $p < .001$, 95% CI [.78, .98].

## Results

This section consists of two parts. The first focuses on the differences between rusticated versus nonrusticated participants in event-dating protocols. The second focuses on the relation between the event-dating protocols and the important events.

### Comparison between rusticated and nonrusticated groups

**Living-in-history effect** Table 2 presents the percentage of dating protocols assigned to each response category in the rusticated and nonrusticated groups. Overall, the Cultural Revolution was mentioned in 10.8% of the justified protocols, and other public events showed up in 5.5% of the protocols. Among these additional events were the founding of the People's Republic of China (1949, 0.9%), the Great Chinese Famine (1959–1961, 0.8%), and the Beijing Olympics (2008, 0.8%). The chi-square tests in Table 2 showed that the rusticated group mentioned the Cultural Revolution far more often than the nonrusticated group (21.6% vs. 5.3%) did, and the two groups dated comparable percentages of event memories in relation to other historical events (4.2% vs. 6.1%).

Figure 1 presents the temporal distribution of justified protocols, binned by calendar year, for the rusticated group (top panel) and the nonrusticated group (bottom panel); the black bars indicate responses that made mention of the Cultural Revolution; the gray bars indicate references to other historical events and the white bars indicate nonhistorical references. The figure showed that the rusticated group recalled more memories occurred during the Cultural Revolution and mentioned the revolution more often than the nonrusticated participants in event-dating task. That is, the rusticated group displayed an upheaval bump, recalling more events from the ten turbulent years of Cultural Revolution than from the years that bracketed the revolution.

To test this observation, we restricted the analyses to events that happened between 1955 and 1987 and divided the span into three bins with equal duration of years: the preturbulent period (1955–1965), the Cultural Revolution period (1966–1976), and the postturbulent period (1977–1987). First, in terms of the number of event memories, the rusticated group recalled significantly more events in the turbulent period than in the preturbulent period (27.4%[3] vs. 11.6%) of a total of 259 event memories in the rusticated group, $\chi^2(1) = 16.64$, $p < .001$, and the postturbulent period (27.4% vs. 12.4%), $\chi^2(1) = 14.77$, $p < .001$; whereas the nonrusticated group recalled an equivalent number of events in the turbulent period than in the preturbulent period (14.7% vs. 14.9%) of a total of 511 event memories in the nonrusticated group, $p > .10$, and only marginally more events than in the postturbulent period (14.7% vs. 10.8%), $\chi^2(1) = 3.08$, $p = .08$. Second, the rusticated group more frequently used the Cultural Revolution as temporal landmarks when they dated event memories that happened in the turbulent period compared to events happening in the preturbulent period (67.6% vs. 10.0%), $\chi^2(1) = 28.00$, $p < .001$, and the postturbulent period (67.6% vs. 15.6%), $\chi^2(1) = 23.86$, $p < .001$. The nonrusticated group also mentioned the Cultural Revolution more frequently when dating events from the turbulent period than from the preturbulent (26.7% vs. 5.3%), $\chi^2(1) = 12.94$, $p < .001$, and postturbulent periods (26.7% vs. 3.6%), $\chi^2(1) = 11.97$, $p < .01$. Thus, the rusticated group formed an obvious upheaval bump whereas the nonrusticated group did not, demonstrating a stronger Living-in-History effect in the rusticated group. Both groups, however, were more likely to use the Cultural Revolution as a temporal landmark when they were dating events that took place during that period than when they were dating events that took place at other points in time, though this tendency was much more pronounced for rusticated individuals than for nonrusticated individuals.

**Transitional impact of the Cultural Revolution** Given that the Living-in-History effect occurs when a public event produced a pronounced change on the fabric of daily life (e.g., Brown, 2016), it follows that the rusticated group was expected to have experienced a greater degree of change, particularly material change, than the nonrusticated group. To test this claim, we computed two average Transitional Impact Scale scores for each participant; one represented the average response to the six material-change questions and the other the average response to the six psychological-change questions. We conducted a 2 (group: rusticated or nonrusticated; between-subjects) × 2 (change type: material or psychological; within-subjects) mixed ANOVA. The main effect of group or change type was not significant, $ps > .10$. The interaction was marginally significant, $F(1, 44) = 3.13$, $MSE = .34$, $p = .084$, $\eta_p^2 = .07$. Consistent with the difference in the Living-in-

[3] It is, of course, possible that between-event priming (Brown, 2005; Brown & Schopflocher, 1998a, 1998b) or period-event priming (Mace, 2005) may have affected these percentages and, by extension, the magnitude of the Living-in-History effect reported above. However, the important point here is not the exact values obtained in this study and others in this series (Bohn & Habermas, 2015; Brown et al., 2009; Brown et al., 2012; Brown & Lee, 2010; Zebian & Brown, 2014) but the presence of large, systematic between-group differences in these measures.

**Table 2** Frequency and percentage of dating protocols assigned to each response category in the rusticated versus nonrusticated group

| | Number (%) of citations | | |
|---|---|---|---|
| Response category | Rusticated group | Nonrusticated group | Chi-square value |
| *Historical* | **67 (25.9%)** | **58 (11.4%)** | **26.64**$^{***}$ |
| Cultural Revolution (1966–1976) | 56 (21.6%) | 27 (5.3%) | 47.71$^{***}$ |
| Other historical/public events | 11 (4.2%) | 31 (6.1%) | 1.10 |
| *Script-consistent* | **39 (15.1%)** | **118 (23.1%)** | **6.84**$^{**}$ |
| College or educational experiences | 13 (5.0%) | 31 (6.1%) | |
| Marriage | 6 (2.3%) | 21 (4.1%) | |
| Retirement | 8 (3.1%) | 16 (3.1%) | |
| First job | 4 (1.5%) | 18 (3.5%) | |
| Death of a close family member | 5 (1.9%) | 14 (2.7%) | |
| Child's birth | 2 (0.8%) | 13 (2.5%) | |
| Grandchild's birth | 1 (0.4%) | 5 (1.0%) | |
| *Script-divergent* | **34 (13.1%)** | **76 (14.9%)** | **.43** |
| Move to another community | 14 (5.4%) | 29 (5.7%) | |
| Move to another city | 10 (3.9%) | 22 (4.3%) | |
| Job change | 9 (3.5%) | 17 (3.3%) | |
| Serious disease/injury | 1 (0.4%) | 8 (1.6%) | |
| *Personal or generic* | **79 (30.5%)** | **183 (35.8%)** | **2.16** |
| *Relational* | **29 (11.2%)** | **63 (12.3%)** | **.21** |
| Others' age or developmental status | 13 (5.0%) | 22 (4.3%) | |
| Others' script-consistent events | 9 (3.5%) | 14 (2.7%) | |
| Others' script-divergent events | 1 (0.4%) | 12 (2.3%) | |
| Others' birth or death | 4 (1.5%) | 8 (1.6%) | |
| Other relational events | 2 (0.8%) | 7 (1.4%) | |
| *Pop/sports/weather* | **11 (4.2%)** | **13 (2.5%)** | **1.65** |
| Total | 259 (100%) | 511 (100%) | |

Numbers in boldface represent the values for each category of dating protocols

$^{**}p < .01$. $^{***}p < .001$

History effect reported above, simple effect analysis revealed that the rusticated group experienced more material change than the nonrusticated group (3.94 vs. 3.33), $F(1, 44) = 4.60$, $MSE = .84$, $p < .05$, $\eta_p^2 = .09$. Interestingly, the between-group difference for psychological change was not reliable, 3.69 vs. 3.53, $p > .10$.

**Types of temporal landmarks** The older Chinese adults dated autobiographical events in relation to both personally experienced script-consistent transitions (21.6%) and script-divergent transitions (14.3%; see Table 2). The percentage of script-consistent transitions in our sample was smaller than that in a sample of older Germans (about 33%; Bohn & Habermas, 2015). This might be due to the differences in the types of events that belong to script-consistent transitions. For example, the coded script-consistent transitions in the sample of older Germans included divorce, religious ritual, falling in love, and leaving home, which did not show up in the dating protocols we collected in our sample and thus were not coded into a script-consistent category.

The rusticated group dated significantly fewer events in relation to script-consistent transitions than the nonrusticated group (15.1% vs. 23.1%; see Table 2 for statistics), whereas the two groups showed no significant difference in the frequency of using script-divergent transitions to support date estimates (13.1% vs. 14.9%). Moreover, participants dated 11.9% of their personal memories in relation to others' life transitions and developmental status, demonstrating a new category of dating protocols in older Chinese. There was no significant difference between the rusticated and the nonrusticated groups concerning the percentage of relational dating protocols (11.2% vs. 12.3%).

## Relation between self-nominated important events and dating protocols

**Types of important events** Table 3 presents a list of the most commonly mentioned events elicited by the important-events task. Overall, participants rated the events with scores greater than 3 on a 5-point scale in terms of psychological change (*M*

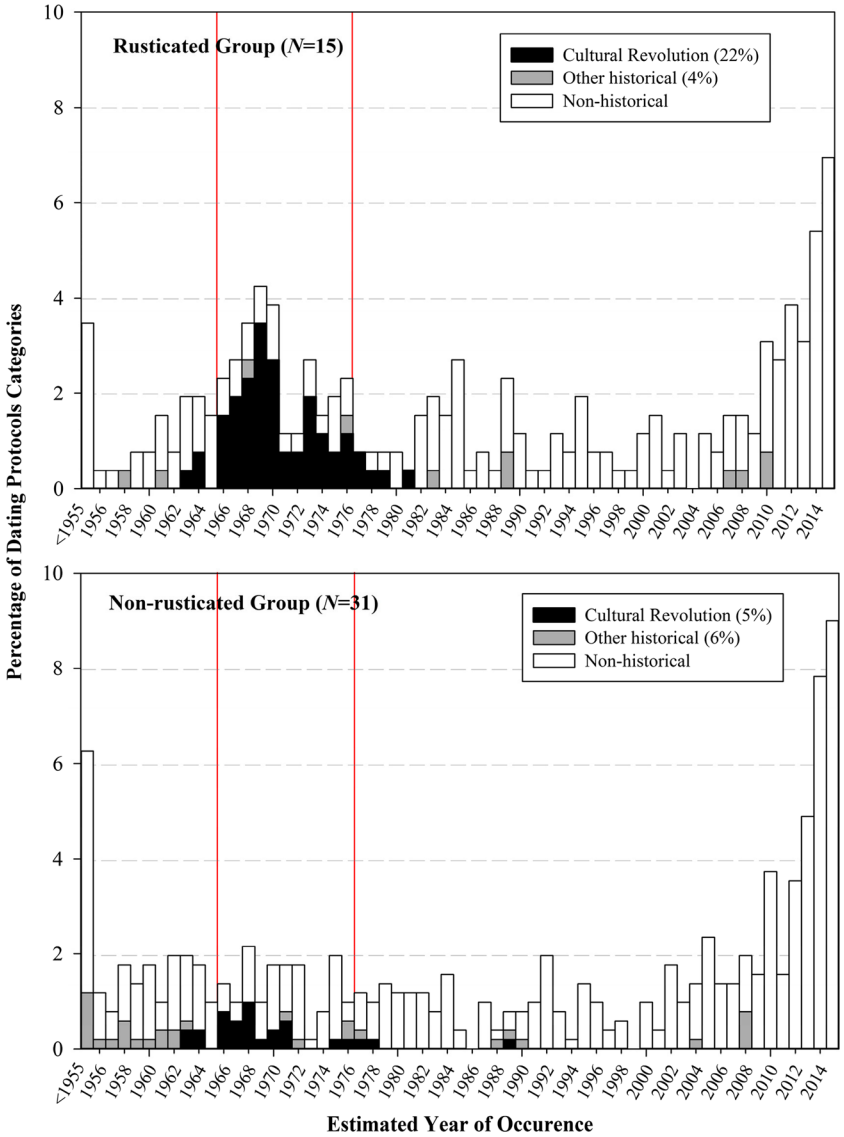


**Fig. 1** Percentage of word-cued events as a function of historical category of dating protocols and estimated year of occurrence, for the rusticated group (*top panel*) and nonrusticated group (*bottom panel*). *Red lines* represent the starting and ending years of the Cultural Revolution. (Color figure online)

= 3.59, *SD* = 1.21) and material change (*M* = 3.09, *SD* = 1.51), suggesting that the self-nominated important events brought about medium to large changes in the lives of our participants. Consistent with the stronger Living-in-History effect in the rusticated group, these participants cited the Cultural Revolution more frequently as a personally important event than the nonrusticated counterparts (25.0% vs. 6.5%), $\chi^2(1) = 25.25$, $p < .001$. In contrast, the rusticated group did not display significant differences in the proportion of other historical events cited as important events compared to the nonrusticated group (1.8% vs. 3.4%), the proportion of script-consistent transitions (29.5% vs. 23.8%), the proportion of script-divergent transitions (12.5% vs. 18.4%), or the proportion of relational events (14.3% vs. 14.9%), all *p*s > .10.

**Temporal distribution of important events and word-cued events** Figure 2 presents the temporal distribution of important-events categories (top panel) and the temporal distribution of word-cued events as a function of dating-protocol categories (bottom panel). The two distributions differed in the age when most of events were recalled. Consistent with previous observations (e.g., Koppel & Berntsen, 2015; Koppel & Rubin, 2016; Rubin & Schulkind, 1997), the bump for word-cued events was located from 11 to 20 years of age, whereas the bump for important events was located from 16 to 30 years of age. To test the significance of the bump for word-cued events, we compared the proportion of memories, occurring within the bump period of 11 to 20 versus the adjacent 10-year period of 21 to 30. Similarly, to test the significance of the bump for important events, we compared the proportion of

**Table 3** Personally important events with ratings in valence and transitional impact

| Personally important event | Number (%) of citations | Age at event *M* (*SD*) | Valence *M* (*SD*) | Psychological change *M* (*SD*) | Material change *M* (*SD*) |
|---|---|---|---|---|---|
| *Historical* | **56 (15.0%)** | **22.46 (10.51)** | **.04 (1.54)** | **3.54 (1.35)** | **3.25 (1.61)** |
| Cultural Revolution (1966–1976) | 45 (12.1%) | 20.51 (5.14) | .11 (1.47) | 3.58 (1.32) | 3.51 (1.53) |
| Other historical/public events | 11 (3.0%) | 30.45 (20.09) | -.27 (1.85) | 3.36 (1.50) | 2.18 (1.54) |
| *Script-consistent* | **95 (25.5%)** | **33.77 (16.52)** | **.64 (1.54)** | **3.67 (1.14)** | **3.31 (1.45)** |
| College or educational experiences | 20 (5.4%) | 18.35 (9.38) | 1.50 (.69) | 4.15 (.75) | 3.50 (1.40) |
| Death of a close family member | 19 (5.1%) | 41.32 (17.12) | −1.68 (.58) | 3.58 (1.35) | 2.16 (1.34) |
| Marriage | 16 (4.3%) | 28.00 (3.14) | 1.37 (.86) | 3.94 (.772) | 3.56 (1.32) |
| Child's birth | 11 (3.0%) | 30.45 (2.30) | 1.55 (1.21) | 3.82 (1.33) | 3.73 (1.35) |
| Retirement | 11 (3.0%) | 53.45 (3.36) | -.09 (1.30) | 3.00 (1.18) | 3.45 (1.37) |
| First job | 10 (2.7%) | 20.40 (3.44) | 1.45 (.71) | 3.60 (1.35) | 4.00 (1.16) |
| Grandchild's birth | 8 (2.1%) | 60.13 (5.36) | 1.25 (1.04) | 3.00 (1.07) | 3.38 (1.60) |
| *Script-divergent* | **62 (16.6%)** | **41.03 (13.17)** | **.53 (1.38)** | **3.42 (1.29)** | **3.73 (1.48)** |
| Move to another community | 20 (5.4%) | 46.80 (7.38) | 1.05 (1.19) | 3.65 (1.23) | 4.10 (.91) |
| Job change | 19 (5.1%) | 37.53 (10.82) | .68 (1.06) | 3.42 (1.31) | 3.68 (1.57) |
| Move to another city | 13 (3.5%) | 38.31 (13.89) | .69 (1.25) | 3.54 (1.05) | 4.85 (.38) |
| Serious disease/injury | 10 (2.7%) | 39.70 (21.34) | −1.00 (1.49) | 2.80 (1.62) | 1.60 (.10) |
| *Relational* | **55 (14.7%)** | **46.13 (19.76)** | **.87 (1.35)** | **3.53 (1.14)** | **2.64 (1.37)** |
| Others' script-consistent events | 21 (5.6%) | 54.95 (9.08) | 1.48 (.68) | 3.52 (1.17) | 2.48 (1.12) |
| Others' script-divergent events | 21 (5.6%) | 45.19 (21.07) | .14 (1.62) | 3.29 (1.15) | 2.67 (1.49) |
| Relationship with others | 13 (3.5%) | 33.38 (23.79) | 1.08 (1.19) | 3.92 (1.04) | 2.85 (1.57) |
| *Other important events coded* | **84 (22.5%)** | **44.55 (17.12)** | **.77 (1.35)** | **3.71 (1.15)** | **2.79 (1.35)** |
| Recreation, interests, or hobbies | 20 (5.4%) | 58.80 (6.06) | 1.05 (1.05) | 3.90 (1.17) | 2.95 (1.43) |
| Job promotion | 11 (3.0%) | 49.36 (7.35) | 1.45 (.69) | 3.73 (1.10) | 3.09 (1.30) |
| Quest for identity | 11 (3.0%) | 30.45 (22.66) | .73 (1.35) | 4.27 (.79) | 2.82 (1.08) |
| Occupational award | 10 (2.7%) | 41.00 (12.28) | 1.10 (1.20) | 3.30 (1.06) | 2.50 (1.43) |
| Political activity (e.g., joining the Party) | 8 (2.1%) | 36.13 (14.88) | 1.50 (.76) | 3.75 (1.17) | 2.50 (1.60) |
| Conflict at work | 5 (1.3%) | 42.60 (12.95) | −2.00 (0) | 3.20 (1.64) | 3.20 (1.30) |
| Parenting | 4 (1.1%) | 48.25 (17.21) | 1.00 (.82) | 3.00 (1.41) | 2.25 (1.50) |
| Dropping out of school | 3 (0.8%) | 13.67 (8.02) | −1.67 (.58) | 5.00 (0) | 4.33 (1.16) |
| Filial piety (e.g., taking care of parents) | 3 (0.8%) | 46.00 (8.54) | 0.00 (1.00) | 3.00 (1.00) | 2.67 (.58) |
| Accident | 3 (0.8%) | 20.00 (6.08) | 0.00 (2.00) | 2.67 (1.53) | 1.00 (0) |
| Personal health issue | 2 (0.5%) | 61.50 (3.54) | 1.50 (.71) | 4.00 (0) | 2.50 (2.12) |
| Buying homes | 2 (0.5%) | 56.00 (8.49) | .50 (.71) | 3.50 (.71) | 2.50 (2.12) |
| Pension increase | 2 (0.5%) | 54.50 (6.36) | 2.00 (0) | 4.00 (1.41) | 3.00 (0) |
| *Other* | **21 (5.6%)** | **32.57 (22.04)** | **-.05 (1.47)** | **3.48 (1.44)** | **2.30 (1.65)** |
| Total | 373 (100%) | | | | |

*Note.* To clarify the valence of an event, we converted the original scale to a −2 (*extremely negative*) to 0 (*neutral*) to +2 (*extremely positive*) scale; psychological change and material change were rated from 1 (*a little*) to 5 (*a lot*)

Numbers in boldface represent the values for each category of important events

memories, occurring within the bump period of 16 to 30 versus the adjacent 15-year period of 31 to 45. These analyses confirmed the significance of the bumps, for word-cued events (21.4% vs. 14.0%), $\chi^2(1) = 11.90$, $p = .001$, and for important events (31.6% vs. 16.4%), $\chi^2(1) = 18.15$, $p < .001$.

The distributions also mirror the different age time tables for script-consistent, script-divergent, and relational transitions. Specifically, important script-consistent events tended to cluster between age 11 and 30; important script-divergent events, by their nature, can occur at any age across the life span with relatively increased frequency after age 30; and important relational events tended to accumulate after age 40. Interestingly, the temporal distribution of important script-consistent events, script-divergent events, and relational events resembled the distribution of the corresponding

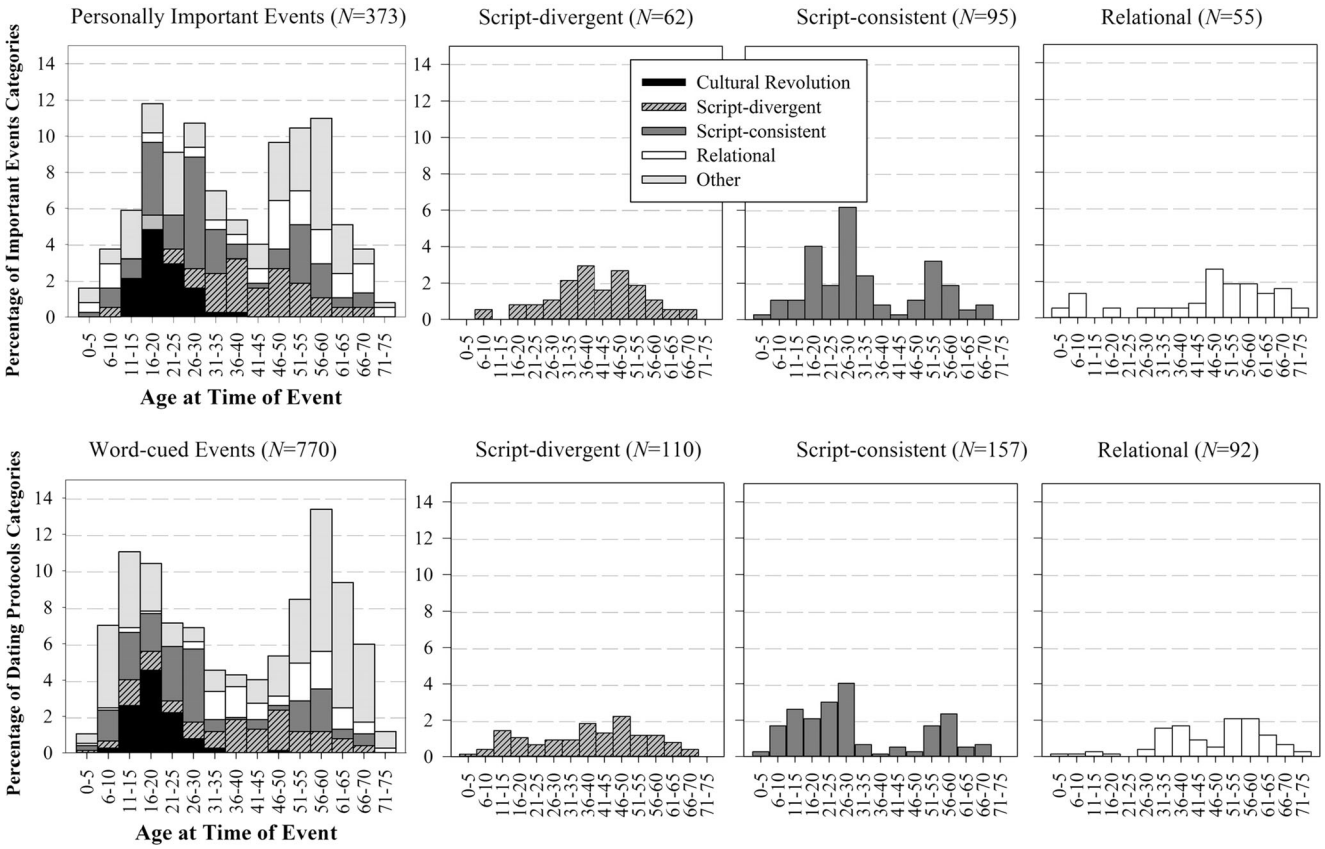


**Fig. 2** Percentage of events, binned by participant's age at time of occurrence, as a function of important-events categories (*top panel*) and dating-protocols categories (*bottom panel*)

category in the dating protocols. As most of the important events received relatively high scores in transitional impact (see Table 3), these suggest that autobiographical memories pile up around transitions, regardless of whether those transitions occurred during the formative years or during other times in the life span.

**Transitional impact of important events and its effect on event dating** Of the self-nominated important events, 18.5% were used at least once to support date estimates. Table 4 presents the valence and transitional impact of each category of important events that were used or unused as temporal references. The event categories shown in Table 4 were identical to those in Table 3. Generally speaking, the important events that were used as temporal references were rated as having produced more material change than ones not used as temporal landmarks, 3.62 (1.43) versus 2.97 (1.50), $t(371) = 3.28$, $p < .01$, Cohen's $d = .44$, but they were rated as having produced comparable levels of psychological change, 3.65 (1.26) versus 3.57 (1.21), $t(371) = .49$, $p > .10$. There was no significant difference with respect to the valence of important events that were used versus unused as temporal landmarks, $p > .05$.

We performed binary logistic regression analyses to determine the effects of valence, material change, and psychological change on the likelihood that participants used important events to support date estimates in event-dating task. To compare the effect of material versus psychological change, we ran two step-wise logistic regression analyses. In the first analysis, we controlled psychological change and valence and then tested whether material change would still predict the likelihood that important events were used as temporal references. The model that included only psychological change and valence was not significant, $\chi^2(2) = .49$, $p > .10$; whereas the full model (i.e., the one that also included material change) was, $\chi^2(3) = 11.69$, $p = .009$. Specifically, the entry of material change in the second model increased the variance that the model explained from 0.2% to 5.0% (Nagelkerke's $R^2$). Thus, consistent with the mean differences reported above, we found events rated relatively high in material impact were more likely used as temporal landmarks than those that were not, $\beta = .32$, Wald's $\chi^2(1) = 10.45$, $p = .001$, odds ratio (OR) = 1.38, 95% CI [1.14, 1.68]. In contrast, important events with increasing impact in psychological change failed to predict an increase in their use as temporal reference points, $\beta = -.08$, Wald's $\chi^2(1) = .74$, $p = .39$, OR = .92, 95% CI [.77, 1.11]. The effect of valence also failed to be significant, $\beta = -.05$, Wald's

**Table 4** Valence and transitional impact of important-events categories that were used and unused as temporal references

| Personally important event | Number (%) of citations | | Valence *M* (*SD*) | | Psychological change *M* (*SD*) | | Material change *M* (*SD*) | |
|---|---|---|---|---|---|---|---|---|
| | used | unused | used | unused | used | unused | used | unused |
| Historical | 19 | 37 | -.32 (1.70) | .22 (1.44) | 3.74 (1.33) | 3.43 (1.37) | 3.53 (1.47) | 3.11 (1.68) |
| Cultural Revolution | 14 | 31 | -.29 (1.59) | .29 (1.40) | 3.64 (1.45) | 3.55 (1.29) | 3.79 (1.48) | 3.39 (1.56) |
| Other historical/public events | 5 | 6 | -.40 (2.19) | -.17 (1.72) | 4.00 (1.00) | 2.83 (1.72) | 2.80 (1.30) | 1.67 (1.63) |
| Script-consistent | 24 | 71 | .42 (1.53) | .72 (1.54) | 3.63 (1.35) | 3.69 (1.08) | 3.58 (1.38) | 3.32 (1.46) |
| Script-divergent | 16 | 46 | .88 (1.15) | .41 (1.44) | 3.56 (1.21) | 3.37 (1.32) | 4.19 (1.28) | 3.57 (1.53) |
| Relational | 6 | 49 | 1.50 (.84) | .80 (1.38) | 3.67 (1.03) | 3.51 (1.16) | 2.50 (1.52) | 2.65 (1.36) |
| Other important events coded | 3 | 81 | 1.33 (.58) | .75 (1.37) | 3.33 (1.53) | 3.73 (1.14) | 3.33 (1.53) | 2.77 (1.35) |
| Other | 1 | 20 | 2.00 (0) | -.15 (1.42) | 5.00 (0) | 3.40 (1.43) | 5.00 (0) | 2.15 (1.57) |
| Total | 69 | 304 | .48 (1.51) | .58 (1.45) | 3.65 (1.26) | 3.57 (1.21) | 3.62 (1.43) | 2.97 (1.50) |

*Note*. To clarify the valence of event, we converted the original scale to a −2 (*extremely negative*) to 0 (*netrual*) to +2 (*extremely positive*) scale. Psychological change and material change were rated from 1 (*a little*) to 5 (*a lot*).

$\chi^2(1) = .20, p = .66$, OR = .95, 95% CI [.75, 1.20]. In the other analysis, we entered material change and valence first and then tested whether psychological change, beyond material change, predicted the likelihood that an event would be mentioned in the dating protocols. The model in the first step was significant, $\chi^2(2) = 11.50$, $p = .003$, but the entry of psychological change and valence in the second step did not significantly increase the variance that the model explained.

Overall, the material impact of a transition that changed whom a person encounters and where it occurs—but probably not the type or the valence of a transition per se—influenced the way older Chinese organize autobiographical memories. The findings provide converging evidence for the claim that lifetime periods are delineated by transitions that produced a marked and enduring change in a person's material circumstances and that this is true regardless of whether the transition also engenders psychological change (Brown et al., 2012; Enz et al., 2016; Shi & Brown, 2016).

## Discussion

One aim of the current study was to examine the impact of the Cultural Revolution on the organization of autobiographical memory. To this end, we collected word-cued memories and event-dating protocols from Chinese people who had been adolescents during this particularly tumultuous historical period. We found that rusticated individuals often dated personal memories in relation to the Cultural Revolution and that nonrusticated individuals did not. Also, and as predicted, the presence of the Living-in-History effect was related to the degree of material change, and not the degree of psychological change, brought about by the revolution (cf. Nourkova & Brown, 2015). These findings are consistent with the transition theory account of the Living-in-History effect (Brown, 2016; Brown et al., 2016) and provide further support for the claim that this effect is graded across segments of society or across geographical regions (Bohn & Habermas, 2015; Brown & Lee, 2010; Brown et al., 2009; Zebian & Brown, 2014).

It is worth noting that the current study was the first to investigate the impact of the Cultural Revolution on autobiographical memory and only one of a handful of studies that have explicitly addressed the ways that public events affect the organization and contents of autobiographical memory (e.g., Bohn & Habermas, 2015; Brown et al., 2009; Brown et al., 2016; Conway & Haque, 1999). Thus, we are not yet in the position to answer all the questions that surface when the Living-in-History effect is produced by a particular historical event and in a particular segment of society. For example, there are a number of individual-difference variables that could conceivably determine the impact that rustication had on the individuals affected by it and hence the magnitude and form of the Living-in-History effect. These include secondary factors like the duration of rustication, the nature of the activities that our rusticated participants experienced and social roles that they were assumed during and after rustication, and the degree to which the period of rustication differed from the pre and postrustication periods. Clearly, additional studies are required to understand how factors like these influence the contents and organization of autobiographical memory and their relation to a collective past.

Given these questions, it is clear that one limitation of the current study was the relatively small number of rusticated individuals who took part. In addition, the unequal sample sizes of the rusticated and nonrusticated participants can be seen as an issue. Thus, future research examining the mnemonic impact of the Cultural Revolution should use an

increased sample size, in part to balance the number of participants who were and were not rusticated and in part to have a sample that is large and varied enough to enable researchers to analyse meaningful individual differences.

In addition to expanding scope of the Living-in-History project to cover an Asian sample, this study's design allowed us to catalogue the types of events that were considered important by older Chinese and the types of events that they used as temporal landmarks. Here we found that our participants selected script-consistent events, script-divergent events, and relational events as being personally important and that these same event types were prominent in the dating protocols. Interestingly, the three event types were distributed differently across the life span but in the same way across the two tasks. Below we consider several aspects of these new findings.

### Relating important events to dating protocols

In this first attempt to link self-nominated important events to event dating, we found that 19% of these important events were mentioned at least once in the dating protocols. This finding is not inconsistent with the general claim that transitions are used to date events (Brown et al., 2012). It does, however, suggest that not all temporal landmarks are major life transitions. This is an interesting point and has motivated us to take a closer look at the information people mentioned when important events were not referenced in the protocols. An examination of these protocols indicated that people sometimes mentioned *transition-related* events, rather than the transitions themselves. For example, an individual may report *child's birth* as one of her most important events. However, instead of using this event as a temporal reference, she may mention *an accident* related to the pregnancy that happened several months before the birth. Because this individual may not directly elaborate on the relationship between the accident and the child's birth, the event identified in the dating protocol would be "an accident" rather than "having my child." These observations suggest that some of the events used as temporal landmarks might be episodes in transition narratives (i.e., stories about the circumstances surrounding important life changes) and that accessing a transition-narrative event while dating another event can provide a pathway to explicit temporal information associated with the transition itself. Clearly, this speculation calls for further study.

### Transition types and temporal-landmark types across the life span

In addition to demonstrating the powerful, if selective, impact of the Cultural Revolution on the organization of autobiographical memory, the present study yielded an interesting set of findings concerning the distribution of important life events and temporal landmarks and the relationship between them (see Fig. 2). For one thing, we found that script-consistent transitions were frequently used to date events that happened during the formative years and that the self-nominated important events that happened during this period also tended to be script-consistent. This is broadly consistent with the cultural life-script theory account for the standard reminiscence bump (Berntsen & Rubin, 2004; Collins, Pillemer, Ivcevic, & Gooze, 2007), which holds that events included in the cultural life script organize autobiographical memory in late adolescence and early adulthood.

When focus shifts to the middle or later adulthood, we observed that script-divergent transitions and relational events increased in their relative prominence in both the important-events task and the dating task. It is worth noting that the script-divergent transitions mainly comprised relocation and change to a different line of work (see Tables 2 and 3), and thus this later-life bump for script-divergent transitions echoes the relocation bump observed when memories were collected from people who had moved in middle age (Enz et al., 2016). In addition, we found that participants tended to employ relational events as temporal landmarks to date the events that occurred in later adulthood. Again, the tendency was mirrored in the important-events task which indicated that relational events play increasingly prominent roles in people's lives as they grow older (or as their children move into young adulthood).

Overall, then, these data indicate that script-consistent transitions, such as marriage and first job, tended to occur in early adulthood. Script-divergent transitions, such as relocation and illness, though they could occur at any age across the life span, show an increase in middle adulthood, and relational events, such as children or grandchildren's life transitions, tended to accumulate in one's later adulthood. This pattern is in accordance with a content analysis performed on the life stories of the Dutch in their young, middle, and later adulthood (e.g., Assink & Schroots, 2010). Clearly, the temporal distributions of script-consistent, script-divergent, and relational events reflect the pattern of transitions that underlie the human life course. At the same time, the temporal distributions suggest that autobiographical events accumulate around transitions, including script-consistent transitions in younger adulthood and script-divergent transitions in middle or later adulthood.

### Relational category in dating protocols and important events

A new category of information appears in the dating protocols produced by this sample of older Chinese; as noted above, these individuals frequently dated personal memories in relation to transitions that happened to their family members or

important others. In parallel with this finding, we observed that these individuals also sometimes cited events experienced by others when reporting personally important memories. Typical examples of this sort of events include a child's first job or marriage, and a spouse changing his or her job or retiring.

The appearance of a relational strategy in the event dating and the presence of relation-based events among the self-nominated important events collected suggest that it may be necessary to expand the concept of autobiographical memory to include memories created by (important) events experienced by close-others (e.g., Pillemer, Steiner, Kuwabara, Thomsen, & Svob, 2015; Svob & Brown, 2012; Thomsen & Pillemer, 2016). With this in mind, it will be useful and interesting when conducting studies like this one to also include relation-based categories when coding dating protocols and self-nominated events. It could be that narrow focus on self-implicating memories has made it difficult for researchers to appreciate the prevalence and the importance of such relational memories. Alternatively, it could be a cultural aspect to this issue. Prior studies on event dating and important life events have focused almost exclusively on participants from Western cultures (but see Shi & Brown, 2016, for event dating; Zaragoza Scherman, Salgado, Shao, & Berntsen, 2015, for important life events). It is of course well established that East Asian and Western individuals think about themselves differently. In East Asian cultures, an interdependent or relational self-construal is based on the premise that people are connected with one another, so the self is defined, at least in part, by relationship or group membership (Heine, 2001; Markus & Kitayama, 1991; Wang & Ross, 2007). In Western cultures, however, an independent self-construal is based on the view that people are autonomous and separated from each other.

Indeed, the nomination of relational events in this study echoes a previous finding that when middle-aged Chinese and Americans recalled 20 memories that first came to mind from any period of their lives, Chinese recalled more socially oriented memories and fewer self-focused memories than Americans (e.g., Conway, Wang, Hanyu, & Haque, 2005; Wang & Conway, 2004). This result is also consistent with a study in which middle-aged and older adults from Mexico, Greenland, China, and Denmark were asked to recall the most positive and the most traumatic events in their lives (Zaragoza Scherman et al., 2015). Researchers found that 18% of the positive events reported by Chinese were experienced by others, a percentage higher than those reported by participants from Mexico, Greenland, and Denmark. Hence, the current findings dovetail with existing research and provide additional support for the notion that a more inclusive understating of autobiographical memory is needed, at least when dealing with individuals from interdependent societies.

## Conclusion

In brief, this study produced two sets of results. First, we found that Chinese who were rusticated during the Cultural Revolution displayed a robust Living-in-History effect and that those who were not, did not. Second, we observed that the types of events people typically considered important and those that typically served as temporal landmarks changed as a function of age, but displayed the similar temporal distributions. Thus, although the nature and density of transitions appear to change across the life span and as function of external forces and cultural patterns, the way these transitions affect autographical memory does not.

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