Using a Reminiscence-based Approach to Investigate the Cognitive Reserve of a Healthy Aging Population

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ABSTRACT

Objectives: The concept of Cognitive Reserve (CR) has been used to account for brain plasticity in older adults that may underlie the resilience against the effects of aging or pathology on cognitive abilities. This study aims at exploring the proxies of CR in a sample of healthy older adults by analyzing their spontaneous reminiscence through a discourse analysis approach.

Method: Fifteen community-dwelling older adults were asked to participate in a video-recorded, spontaneous reminiscence interview. Interviews were transcribed according to Conversation Analysis, and two judges classified the interview content identifying five main markers of CR: enriched environment, cognitively stimulating activities, education, physical activity, and social interaction.

Results: Reminiscence allowed to identify markers of CR. Sharing stories that are linked to CR markers promote positive emotion, coherent sense of self, and cognitive evaluation of the importance of the social network.

Conclusions: Reminisce looks like a possible approach not only to indirectly evaluate the CR, but also to promote it.

Clinical Implications: The reminisce approach can be used as a clinical tool to assess and increase the CR, help the clinical population to experience more positive emotions, maintain a more defined sense of self, and value more the social resources available.

INTRODUCTION

Data derived from observation of the aging brain in different populations has shown no evidence of a direct relationship between a given form of brain damage and its clinical manifestation (Herrup, 2015): Several studies have observed that some individuals continue to function clinically despite brain pathology (e.g., Crystal et al., 1988; Davis, Schmitt, Wekstein, & Markesbery, 1999; Katzman et al., 1988; Riley, Snowdon, & Markesbery, 2002). Starting from this evidence, Stern (2002, 2003) introduced the concept of cognitive reserve (CR), which can be defined as “the ability to optimize or maximize performance through differential recruitment of brain networks, which perhaps reflect the use of alternate cognitive strategies” (Stern, 2002, p. 451). This concept has been advanced to account for brain plasticity in older adults that may underlie the resilience to the effects of aging or brain pathology such as Alzheimer’s disease on cognitive abilities (Tucker & Stern, 2011; Whalley, Deary, Appleton, & Starr, 2004).

The study and application of CR come with certain levels of complexity. The first is that different models of brain functioning could explain the concept of “reserve.” In his reviews, Stern (2002, 2003) has distinguished between two types of reserve models. On the one side, ‘passive’ models (e.g., Katzman, 1993; Satz, 1993) assume that individuals differ in their brain reserve capacity (BRC), indexed by measures such as brain size or neuronal count. The core idea is that there is some critical, fixed threshold of BRC, which predicts the amount of damage that can be sustained before the clinical expression of a disease (i.e., functional impairment) is recorded or noticed. Individuals with greater BRC—consisting in a higher number of synapses or higher head circumference—would require more pathology to reach this threshold (Steffener & Stern, 2012).
The ‘active’ models, on the other hand, suggest that the brain tries to cope with or compensate for brain pathology. Within these models, CR describes how flexibly and efficiently the individual can make use of available brain reserve (Tucker & Stern, 2011). Stern (2002) has argued that CR enables individuals to compensate for any form of brain damage and still operate efficiently: When the approach used to face a specific task is no longer available because of any form of damage, a higher CR will allow individuals to use alternative paradigms to get the same or similar results. Thus, according to the CR hypothesis, reserve is defined in terms of differences in how cognitive or functional tasks are processed rather than in terms of brain’s structures per se. In other terms, people with higher CR levels do not differ from individuals with lower CR regarding brain anatomy (e.g., the number of synapses), but are able to use more efficient cognitive processing mechanisms. Although passive and active models seem to focus either on the “hardware” or on the corresponding “software” of reserve, they should not be considered as mutually exclusive, but rather as reflecting two different approaches aiming at explaining the same phenomenon - namely individual differences in brain plasticity in older adults (e.g., Mortimer, Snowdon, & Markesbery, 2003).

The concept of CR has been used to explain why individuals with higher education (e.g., Davis et al., 1999; Stern, Alexander, Prohovnik, & Mayeux, 1992), intelligence (Alexander et al., 1997), occupational attainment (Richards & Sacker, 2003; Stern et al., 1994), as well as engagement in leisure activities of an intellectual and social nature (Scarmeas et al., 2003) can sustain significantly larger brain damage before showing functional impairment. Aspects of life experience like educational or occupational attainments are thought to supply reserve in the form of a set of skills or repertoires that allows some people to cope with progressing pathology better than others (Scarmeas & Stern, 2003). For example, taking the level of education into account, Stern and colleagues (1992) found that well educated patients showed a higher degree of disruption of cerebral metabolism and blood flow for a given level of dementia than patients with lower levels of education. This apparently paradoxical result suggests that—although Alzheimer pathology is relatively more advanced in patients with higher levels of education—these patients can cope more efficiently with neuropathological changes. Likewise, other studies have found that people with higher intelligence, more education, or engaging in leisure activities decline more quickly and die sooner once Alzheimer’s pathology is diagnosed (Scarmeas, Albert, Manly, & Stern, 2006; Stern, Albert, Tang, & Tsai, 1999): By the time deficits are clinically evident, the disease has reached a more advanced stage in individuals with high CR. Finally, there is evidence that education and engagement in leisure activities are related to lower risk of functional decline in healthy, nondemented elderly (Scarmeas & Stern, 2003; Snowdon, Ostwald, & Kane, 1989).

A second level of complexity linked to the concept of CR concerns the different and varied proxies that research has used to assess it. A recent meta-analysis involving 135 cross-sectional studies (Opdebeeck, Martyr, & Clare, 2016) has highlighted the variety of methods and proxies used by different researchers to measure CR: Education was the most common proxy of CR (109 studies); occupational attainment was considered in 19 studies, while 31 studies measured CR by the engagement in cognitively stimulating activities. Finally, only six studies used a combination of more than one proxy measure. As a limitation the authors stressed how the reported associations were modest. The authors highlighted the need for further studies to more comprehensively investigate the relationship between the CR and specific, well defined, cognitive functions in healthy and clinical populations. For this reason, finding a way of exploring to a deeper extent which proxies might play a major role in promoting healthy aging, by adopting a form of ecological and comprehensive approach that considers several aspects of individuals’ lives, would possibly add some important and relevant information to the study of the CR.

In this work, we suggest that a promising way of doing this is using a reminiscence-based approach to elicit spontaneous memories in the aging population. Reminiscence is a practice common at all ages (Webster & Gould, 2007), and it is defined as the process of thinking or telling someone about personally significant past experiences, both successful and unsuccessful (Satorres, Viguier,
Fortuna, & Meléndez, 2017). This process entails an awareness of life experiences that may be re-examined and reintegrated (Biassoni, Cassina, & Balzarotti, 2017). In the past few years, several studies have been exploring the effect of reminiscence on various cognitive, social, behavioral, and health outcome measures and recent meta-analyses have documented significant effects on older adults’ well-being (Bohlmeijer, Roemer, Cuijpers, & Smit, 2007; Pinquart & Forstmeier, 2012).

Four processes underlying reminiscence are often mentioned to explain the positive relationship between reminiscence and successful aging: identity-forming and self-continuity; enhancing meaning in life and coherence; preserving a sense of mastery; promoting acceptance and reconciliation (Bohlmeijer et al., 2007). Notably, high levels of CR could (and should) foster all these processes, by allowing individuals to deal with tasks affected by each of the mentioned processes in a more efficient way. If this line of reasoning is true, then one should be able to identify clear markers of CR by analyzing spontaneous reminiscence of healthy elderly. The reminiscence approach would enable to identify not only which proxies of the CR are used, but also to better understand how they may help the older adult to cope with different tasks linked to aging by understanding to which extent each type of tasks (e.g., social, cognitive, physical, etc.) play a role in promoting the CR. Finally, analyzing spontaneous narrations would also allow taking into consideration all the CR proxies at the same time, avoiding the aforementioned limitations highlighted by Opdebeeck and colleagues (2016).

To be able to analyze the data derived from a reminisce activity reliably, we chose to adopt a Discursive Psychology-inspired perspective. Discursive Psychology (DP) links “psychology” and “discourse”: Psychology is intended as something that is displayed, and can hence be studied, in talk and dialogical interactions (Potter, 2005). Within DP, psychology is considered from the perspective of the participants of the dialogical interaction (Potter & Wetherell, 2001). This is possible because language is intended both as constructed and constructive: People when talking “act,” using language as a fundamental tool to construct the social world. Language is also intended as informative: This means that people’s conduct during a conversation has to be treated not as a simple behavior, but as an action (i.e., an intelligent activity; Pomerantz & Fehr, 1997). From this perspective, language involves a series of procedures that are shared among people, which help individuals to coordinate with others in everyday life. This perspective opens the possibility of examining utterances as objects which speakers use with awareness to pursue specific goals while interacting with other people (Wooffitt, 2001).

A standard method used within Discourse Analysis to analyze the transcripts is Conversation Analysis (CA). Conversation Analysis derives from Sack’s work (with the cooperation of Schegloff and Jefferson)—aimed at exploring language and its organization in everyday use. Their main aim was to define a new sociological method to analyze natural occurring interactions (that is to say data-driven and not theory led), starting from the assumption that language use can be seen as an informative site to explore social actions (Wooffitt, 2001). Starting from these theoretical and methodological assumptions, we designed and ran our study aimed at exploring proxies of the CR in a sample of healthy older adults.

**Methods**

**Participants**

We recruited 15 participants (age range: 72–85 years, mean age: 79.13 years, SD = 3.61) by way of advertising the project at local senior centers. We excluded participant with a diagnosis of any form of dementia or cognitive impairment. Exclusion was based on information self-reported by participants. When an individual expressed interest in being involved in the research, they were asked about any diagnose or about cognitive difficulties they have been experiencing. Participants were balanced by gender (F = 8).

We asked each participant to report the total number of years of completed formal education, as well as to list the most frequent leisure activities they have been practicing regularly for the last 10 years. All demographic data are reported in Table 1. Research assistants recorded the interviews at a location chosen by each participant: either the senior center or their own house.

Champlain College’s IRB approved the research project.
Interviews

After reading and signing the consent form, participants were asked to report a significant memory from their past. They were offered the possibility of using prompts (pictures and songs) as a trigger for the reminisce activity. Six participants decided to start their interview using a prompt, five chose a picture representing a landscape, one picked a song. We collected 170 minutes of video recordings (range: 5 minutes to 34 minutes 20 seconds; average length: 9 minutes 30 seconds).

Discourse Analysis

To be able to rely on more solid data, and to develop a model to explain our result, we also analyzed the transcripts of the 15 interviews using CA.

Interviews have been transcribed according to the convention suggested by Jefferson (2004) by two independent judges. Inter-rater reliability was calculated and found to be .87. Transcripts were divided into sections, which have been classified and analyzed according to the topics of interest (i.e., CR markers, see below) by the two judges, who discussed the interpretation/reading.

We identified the CR markers to look for starting from an analysis of the literature. We listed the proxies that we constantly used in studies aiming at assessing the CR (see Opdebeeck et al., 2016) and excluded those that were not well defined or only rarely used. Following these guidelines, we were able to identify five main markers: (1) Enriched environment (EE), e.g., engaging community, active natural environment, cultural/educational opportunities, etc.; (2) Cognitive stimulating activities (CA), e.g., reading, theatre, organizing events, teaching, challenging conversation, etc.; (3) Education (Edu), e.g., formal education, professional training, learning by

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<tr>
<th>Marker</th>
<th>Mean</th>
<th>SD</th>
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<tr>
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**Table 1. Demographic information.**

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<th>Years of Education</th>
<th>Number of Leisure Activities</th>
<th>Use of Prompts</th>
<th>Interview Length</th>
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<tr>
<td>3</td>
<td>75</td>
<td>M</td>
<td>15</td>
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**Table 2. Mean scores and standard deviation of CR markers.**

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<th>CR Markers</th>
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<th>SE</th>
<th>p-Value</th>
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<td>.16</td>
<td>1.00</td>
</tr>
<tr>
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<td>Education</td>
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<td>.12</td>
<td>.60</td>
</tr>
<tr>
<td></td>
<td>Physical Activities</td>
<td>.35</td>
<td>.11</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>Social Activities</td>
<td>-.76</td>
<td>.13</td>
<td>.001</td>
</tr>
<tr>
<td>Cognitive Activities</td>
<td>Enriched Environment</td>
<td>.162</td>
<td>.16</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td>Education</td>
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<td>.15</td>
<td>.269</td>
</tr>
<tr>
<td></td>
<td>Physical Activities</td>
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<td>.17</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>Social Activities</td>
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<td>.19</td>
<td>.06</td>
</tr>
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<td>Education</td>
<td>Enriched Environment</td>
<td>-.20</td>
<td>.12</td>
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<td></td>
<td>Cognitive Activities</td>
<td>-.36</td>
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<td>.59</td>
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<td></td>
<td>Education</td>
<td>.96</td>
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<td></td>
<td>Physical Activities</td>
<td>1.11</td>
<td>.11</td>
<td>.00</td>
</tr>
</tbody>
</table>

**Table 3. Mean difference among CR markers.**

**Interviews**

After reading and signing the consent form, participants were asked to report a significant memory from their past. They were offered the possibility of using prompts (pictures and songs) as a trigger for the reminisce activity. Six participants decided to start their interview using a prompt, five chose a picture representing a landscape, one picked a song. We collected 170 minutes of video recordings (range: 5 minutes to 34 minutes 20 seconds; average length: 9 minutes 30 seconds).
Results

Overall Incidence of CR Markers

As the first step to compare occurrences of CR markers through interviews with different lengths, an index for each marker has been computed using the following equation:

\[ \text{TOT}_{\text{NWords}} \times \text{Occurrence}_{\text{NCRMarker}} = 100 \times X \]

A Repeated Measures GLM ANOVA on the corrected data highlighted a main effect of the type of markers: F(4, 56) = 17.91, p < .001, \( \eta^2 = .56 \) (means scores and standard deviations are reported in Table 2).

Pairwise comparisons confirmed that markers linked to social interactions were used significantly more than all other markers (ME = .76; SE = .13; p = .001; MD_Edu = .96; SE = .15; p < .001; MD_PA = 1.12; SE = .11; p < .001), other than the ones referring to Cognitive Activities (MD_CA = .60; SE = .19; p = .06). No other difference was significant (see Table 3).

Relationship between CR Markers and CR Proxies

A second step was to explore a possible correlation between the CR markers as they emerged from the interviews’ analysis and the self-reported data that we collected from our participants and that represent proxies of the CR: years of formal education and number of leisure activities. Leisure activities were divided into three categories: social, cognitive, and physical.

Given our small sample, a parametric test wouldn’t be adequate. For this reason, we ran a non-parametric correlation, among self-report data (years of formal education completed, number of self-reported leisure activities) and the CR markers derived from the interviews. We selected Kendall’s tau-b (\( \tau_b \)) correlation coefficient, which is recommended when working with small samples.

Results highlighted a significant positive correlation between the number of years of completed education and the occurrence of CR markers linked to education emerging from the interviews (\( \tau_b = .72; p < .001 \)). The total number of leisure activities reported by participants were significantly correlated with the CR markers for cognitive activities (\( \tau_b = .56; p < .01 \)). The specific number of cognitive leisure activities reported by participants correlated positively with the CR markers for cognitive activities (\( \tau_b = .80; p < .001 \)). The number of self reported social leisure activities correlated significantly with the CR markers for social interaction (\( \tau_b = .47; p < .05 \)). No other significant correlation emerged.

Discourse Analysis

Enriched environment

When focusing on CR markers linked to the presence of cognitive environment, we were able to highlight how individuals actively constructed their memories about this topic and also worked at the reconstruction of their sense of self (see Extracts 1, 2, and 3).
**Extract 1.** In Extract 1, where the person reminiscing is sharing a memory linked to learning to fly at their farm, we can see a few clear examples of how this memory is used to foster a personal and social construction of self through memory.

On line 75 the speaker stresses the high point of the narration with an emphasis on the word *WE* - reference to the social aspects of this memory. If the memory starts with a social aspect, then it brings to something relevant for the sense of self of the speaker - and this transition is clearly marked (line 76) by the stress on the word “me.” How the social and personal aspects linked to the memory contributed to the formation of the identity of the speaker is highlighted later (line 79) when after hesitating for a few seconds, possibly to refocus attention (*uhm-*) the narrator stresses the word *THAT.*

**Extract 2.** In Extract 2, where the speaker talks about her attachment to the working landscape of Vermont and how that played a role in her working life, we can see again the process of construction of memory, linked both to a cognitive and an emotional effort.

The cognitive part of memory construction is evident by the stress on the word *reMINds* (line 2) followed by a pause. Moreover, when asked to expand on the memory, the speaker takes time to recall and construct the memory (line 5: *Uhm -SURE -Uhm*). On line 3, we can also detect the influence of emotions in shaping this specific memory: the speaker stresses the word *attached,* and then add a laugh as a marker of emotional connection.

**Extract 3.** Extract 3 offers another good example of active constructions of memory, linked with positive emotions.

The speaker’s enthusiasm is noticeable on line 28 (increased intonation before starting the narration of this new memory and the emphasis on the action of narrating, conveyed by the world *tell*) and 33 (emphasis on *JUST THAT,* to stress how much more interesting/articulated the memory was). The speaker also stresses several times the importance of the narration; line 28: stress on the world *tell;* line 36: emphasis on the world *LOOK,*
which also overlaps with the interviewer’s remark. Enthusiasm and importance of the shared memory are also linked to a strong sense of presence of the narrator of the memory, that we can derive from the raising intonation before *there* on line 33 and stretch of the world *found* (line 36).

This memory that is clearly presented as important, also appears to be co-constructed between the two speakers who are taking part in the interview, as we can derive from the overlapping utterances on lines 32 and 33.

**Cognitive activities**

When reminiscing about cognitive activities, the interviews appear to work also at the definition of the sense of self, especially from a social standpoint.

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**Extract 4.** In Extract 4 we can see how the person being interviewed starts by stressing the importance of precisely define who she is within her group of friends (line 22: she corrects the interviewer, and her urgency is conveyed by the overlapping utterance; she also stress and highlight their group name *FA:Bulous*). The participant (line 30) also stresses the link between cognitive activity (*teaching*) and social life (*my granddaughter*).

**Extract 5.** In Extract 5, we can see (lines 72–74) the participant building a sense of self through memory (reiteration of *I did*, attention drawn to *myself* through the use of intonation) and emotions (use of *laughter*).

**Extract 6.** In Extract 6, we see how the narrator indirectly builds a sense of self by comparing her own identity with the life story of the person she met in the memory that she is sharing (e.g., line 14, emphasis on *parents*, line 16, emphasis on *realize*; line 17 emphasis on *LEFT*). This is also closely linked to a sense of agency from the narrator, which we can derive from the emphasis on *called* (line 9) and on *THAT* (line 19).
Education
While reminiscing about education, the interviewees use the memory to convey a more defined sense of self. They also tend to link these specific memories the use of emotions.

Extract 7. In Extract 7 we can see how the interviewee takes the opportunity to build her sense of self while narrating about her educational experience. She takes time to form and organize the memory (line 84 uhm- (.9)) and uses emphasis to highlight some defining moments for her personal story: line 86 (top person), line 90 (they looked down on me) and line 91 (DO). This process is also supported by the use of emotions: line 87 (laughter) and line 93 (very uhm: anxious).

Extract 8. In Extract 8 we can observe the same mechanism highlighted when discussing Extract 7. The interviewee takes the opportunity to build his sense of self while narrating about his educational experience. He takes time to form and organize the memory (Line 1 I uh- (2.7)) and as a uh- (1.4)) and
uses emphasis to highlight some defining moments in his narration: line 1 \textit{(student} (2.1), and \emph{I think}); line 7 \textit{(reQUESTed}) and line 11 \textit{(TEAcher}).

**Social activity**

When reminiscing about social activities, our participants kept asking for joined attention from the interviewer to stress the relevance of the communication. Something that rarely happened while they were reminiscing about other topics. The importance of social network to help to construct and define the sense of self also emerged.

**Extract 9.** In Extract 9, we can notice how the interviewee, when referring to the brother, stresses the relevance and importance of this part of the memory by “framing” the introduction of the two of them as the main actors of the shared memory (slowing down before \emph{my brother—line 57—and emphasizing the word \emph{I}}). Slowing down when introducing the brother and himself also signaled the need for showing shared attention from the interviewer, who perceived the signal and confirmed her attention (line 58). The memory is also supported and enriched by positive emotions (\emph{laughs}, lines 60 and 61), and by adding non-verbal communication aids to increase effectiveness and relevance of communication (line 59 \textit{(small banging noise)}).

**Extract 10.** In Extract 10 we can see the same use of positive emotions (laughter lines 56 and 57) to stress the relevance of the shared memory, and also to ask for confirmation of joint attention from the interviewer (lines 56 and 57). Throughout the extract, the narrator stresses the importance and relevance of good social support: line 48 \textit{(sent my da:d and older(1.5))}, line 53 \textit{(a COUple of friends)} and line 54 \textit{(.) help me)

**Social activity**

**Extract 11.** In Extract 11, we can see how the narrator uses the social network involved in the memory she is sharing as a way of better define her sense of self at the time the memory occurred (e.g., line 33 \textit{my father said- and I had - I had a wonderful grandfather .hh}), and she makes evident how her social interactions helped shaping her sense of self (line 40 \textit{I wasn/t in college uhm- in college when he got sick and line 41 so I stayed home for a ye:ar and then when that year was up uhm- I did go to*college})

**Extract 12.** In Extract 12, we notice the same use of positive emotions so promote memory and
support its relevance (lines 16 and 21 ((laughs))). The narrator also uses references to her social network to convey a better-defined sense of self while reminiscing (line 12 - <And my husband - a very dear friend> and HER husband for a year we'll just see what we can do to get you back into school, because I already had been allowed to enter the college. line 13 - Uh- Mary and I were BOTH in (. ) nursing school and for two years uh- I was at UVM (because) that was a two year course.

Discussion

This mixed approach aimed at exploring proxies of the CR in a sample of Healthy Aging individuals allowed us to collect some interesting data and gather a better, if preliminary, understanding of how we can identify markers of CR using spontaneous reminiscence.

As a first result, the reminiscence approach was effective in promoting the use of markers linked to the CR that could be easily identified analyzing the interviews’ transcripts. It is interesting to notice how, though all markers were present in our interviews, healthy aging population in Vermont appears to be mainly linked to a robust social network. This result confirms data previously discussed in literature, which highlight both the general effects of positive social interaction to promote healthy aging (Cherry et al., 2013; Seeman, Lusignolo, Albert, & Berkman, 2001) and the specific effect of social interaction as a form of prevention of the decline of cognitive functions (Hughes, Andel, Small, Borenstein, & Mortimer, 2008).

The other proxies, reported to have a positive influence of the CR of healthy individuals, were all part of the participants’ reminiscence, but, interestingly there were mostly associated with references to social interaction. Social activities appear hence to play a role in mediating and promoting the occurrence of other proxies such as cognitive activities or enriched environment. The role of physical activities can be explained differently. Literature explores and reports mainly the effect of cardiovascular activities on cognitive function in the elderly population (for a review, see Angevaren, Aufdemkampe, Verhaar, Aleman, & Vanhees, 2008), while the physical activities reported by our sample were mainly moderate.

Discourse analysis also allowed us to highlight how participants actively engaged in defining their sense of self while reminiscing. This specific
reminisce process can be assimilated to what Wong and Watt (1991) define as integrative reminiscence (aimed at helping an individual is to achieve a sense of self-worth, and coherence about their past), which has been found to be positively associated with successful aging. The fact that reminiscence is helpful to promote a more defined sense of self and that the process is linked to a more positive mood has also been proved with both young and aging individuals (Bryant, Smart, & King, 2005).

It is also interesting to highlight how the most important memories, especially if linked to the relevance of social network, tended to elicit or be linked to positive emotions. This is coherent with data reported in literature (for a review, see Carstensen & Mikels, 2005), where evidence of the fact that elderly tend to show better cognitive performance when dealing with emotional information, if compared to non-emotional. Positive emotions, if not directly mentioned within the reserve model, have been proved to help and foster better coping mechanism in response to stressful situation in aging population (Ong, Bergeman, Bisconti, & Wallace, 2006). It could also be interesting to highlight how a strong correlation between the positive emotional content in early-life autobiographies and longevity 6 decades later emerged from the some of the data reported in the ongoing nun-study (Danner, Snowdon, & Friesen, 2001) aimed at exploring the relationship between emotionally-centered memories and longevity later in life.

If single correlations have been reported in the literature, what is original about this study is the fact that it was able to examine all the proxies linked to the CR and explore how they are used within a spontaneous reminiscence activity. The fact that all the variables that are related to the CR recurred in the spontaneous discourse of our healthy aging population was interesting. First, it stresses and reinforce the link between the markers for the CR discussed in the literature and healthy gaining, and also suggests an ecological approach that can be used to investigate the incidence of these proxies on the life of the elderly. Moreover, our discourse analysis data highlighted how sharing stories that are linked to CR markers promote positive emotion, a coherent sense of self, and cognitive evaluation of the importance of the social network. This implies that being to some extent more aware of the aspects that influence the CR may promote the CR. We know that CR is not fixed but continues to evolve across the lifespan (Tucker & Stern, 2011), and reminisce looks like a possible approach not only to indirect evaluate it, but also to promote it and enhance its benefits.

Future studies might explore the potentialities of this approach to a deeper level, by using a larger sample derived from a more varied geographical location. Exploring the age of reported memories and the possible effect of the age of the memory on its content could also be relevant to gain a better understanding of the link between the CR and reminiscence.

Clinical Implications

- Key variables to increase Cognitive Reserve (both as a form of prevention and to slow down symptoms of dementia, Alzheimer, and similar pathologies) have been identified and discussed.
- The relevance of reminiscence, as a tool for clinical gerontologists, social workers, and caregivers to assess and improve the CR is highlighted.
- Using reminiscence to bring more awareness of markers linked to the CR can help aging population to experience more positive emotions, develop a more coherent sense of self, and be more aware of the positive aspects of the social networks.
- The approach highlighted in this article can be used as a clinical tool to help the clinical population to experience more positive emotions, maintain a more coherent and defined sense of self, value more the social resources available in their network.

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