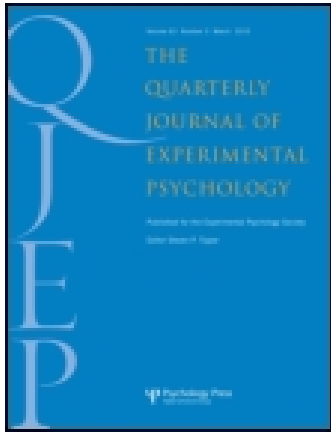


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Steve M. J. Janssen^{a b}, David C. Rubin^{a c} & Martin A. Conway^d

^a Department of Psychology and Neuroscience, Duke University, Durham, NC, USA

^b Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands

^c Center on Autobiographical Memory Research, Aarhus University, Aarhus, Denmark

^d Institute of Psychological Sciences, University of Leeds, Leeds, UK

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The reminiscence bump in the temporal distribution of the best football players of all time: Pelé, Crujff or Maradona?

Steve M. J. Janssen^{1,2}, David C. Rubin^{1,3}, and Martin A. Conway⁴

¹Department of Psychology and Neuroscience, Duke University, Durham, NC, USA

²Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands

³Center on Autobiographical Memory Research, Aarhus University, Aarhus, Denmark

⁴Institute of Psychological Sciences, University of Leeds, Leeds, UK

The reminiscence bump is the tendency to recall more autobiographical memories from adolescence and early adulthood than from adjacent lifetime periods. In this online study, the robustness of the reminiscence bump was examined by looking at participants' judgements about the quality of football players. Dutch participants ($N = 619$) were asked who they thought the five best players of all time were. The participants could select the names from a list or enter the names when their favourite players were not on the list. Johan Crujff, Pelé, and Diego Maradona were the three most often mentioned players. Participants frequently named football players who reached the midpoint of their career when the participants were adolescents (mode = 17). The results indicate that the reminiscence bump can also be identified outside the autobiographical memory domain.

Keywords: Autobiographical memory; Reminiscence bump; Adolescence; Identity; Episodic memory.

When people speak of autobiographical memory, they are referring to the memories a person has of his or her own life experiences (Robinson, 1986). Arguably three of the most robust findings in autobiographical memory research are childhood amnesia, the reminiscence bump, and the increased recall of recent events. Childhood amnesia is the effect that people hardly remember any personal events from the first three or four years of their lives (Nelson & Fivush, 2004; Rubin, 2000). The reminiscence bump is the tendency to recall more

memories from adolescence and early adulthood than from adjacent lifetime periods (Rubin, Rahhal, & Poon, 1998; Rubin, Wetzler, & Nebes, 1986). However, most memories usually come from the most recent years.

The reminiscence bump has been found with various procedures and in various populations. It has been identified when participants recalled personal events freely (Fromholt & Larsen, 1991; Romaniuk & Romaniuk, 1982), when they were asked what the most important events from their

Correspondence should be addressed to Steve Janssen, Hokkaido University, Department of Psychology, Kita-10 Nishi-7, Kita-ku, 060-0810, Sapporo, Japan. E-mail: janssen@let.hokudai.ac.jp

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lives were (Berntsen & Rubin, 2002; Fitzgerald, 1988, 1996; Rubin & Berntsen, 2003), or when they recalled personal events with the help of cue words (Galton, 1879; Rubin et al., 1986). It has been found in the distributions of men and women (Niedźwieńska, 2003; Rubin, Schulkind, & Rahhal, 1999) and in the distributions of middle-aged and older adults (Hyland & Ackerman, 1988). It even has been found in the distribution of young adults, when their distribution was corrected for the increased recall of recent events (Janssen, Chessa, & Murre, 2005). Besides in the distributions of Western participants, it has also been found in the distributions of East-European (Janssen, Gralak, & Murre, in press) and Asian participants (Benson et al., 1992; Conway, Wang, Hanyu, & Haque, 2005; Kawasaki, Janssen, & Inoue, 2011). It appears that the reminiscence bump also occurs outside the autobiographical memory domain, because it has been found in the temporal distributions of favourite books, movies, and records (Holbrook & Schindler, 1989, 1996; Janssen, Chessa, & Murre, 2007; Larsen, 1996; Schulkind, Hennis, & Rubin, 1999; Sehulster, 1996), in judgements of importance of public events (Schuman, Akiyama, & Knäuper, 1998; Schuman & Scott, 1989), and the temporal distribution of memory for public events (Holmes & Conway, 1999; Howes & Katz, 1988; Janssen, Murre, & Meeter, 2008; Rubin et al., 1998; Schuman, Belli, & Bischooping, 1997), and in the structure of a novel about a fictional character (Copeland, Radvansky, & Goodwin, 2009).

Location of the reminiscence bump

The location of the reminiscence bump depends on the method that is used to elicit the memories. Rubin and Schulkind (1997) found that the temporal distribution of autobiographical memory peaks in the second decade of people's lives (10–20 years) when their memories are cued with words, whereas the temporal distribution peaks in the third decade (20–30 years) when people are asked about the most important events from their lives. They also noted that the distribution of

word-cued memories had a strong increase of recent events, while this recency effect was absent in the distribution of important events.

The method that is used to investigate the reminiscence bump also affects the location of the peak in the temporal distribution of favourite books, movies, and records. Holbrook and Schindler (1989) selected popular music hits from the period 1932–1986 and asked participants to rate their preference for each hit on a 10-point scale. Holbrook and Schindler found an inverted U-shaped curve, which peaked at 24 years. Janssen et al. (2007), on the other hand, used a method without preference ratings. They asked participants to name their three favourite books, movies, and records and when they had first read, watched, or listened them. Janssen et al. found that all three distributions had a reminiscence bump in the period in which the participants were between 16 and 20 years old.

Similar results are found when the temporal distribution of memory for public events is examined with different methods. Janssen et al. (2008) asked participants open-ended and multiple-choice questions about news events that had happened in the period 1950–2006 and found that participants performed better on questions about news events that had occurred in the period in which they were between 10 and 25 years old. Schuman and Scott (1989) used a method that was more similar to the method that was used in the present study. They asked participants, who were born between 1915 and 1965, to name events that had changed the world in the period 1930–1985. Their participants were more likely to mention an event when that event had happened in the period in which they were between 10 and 30 years old. Interestingly, the reasons for mentioning the events were often personal experiences.

The present study

In this study, we examine the robustness of the reminiscence bump by investigating whether the effect can also be found in people's judgements of the quality of football players. Participants were asked who the best players of all time were. We expected that they would predominantly name

Pelé, Johan Cruyff, and Diego Maradona, because they are generally regarded as the best players. Since it is difficult to find age effects for materials about which there is much agreement (i.e., possible ceiling effects), participants were therefore asked to name five players.

Because the questionnaire was presented on the Internet, we were able to collect the results of more than 600 participants, which allowed us to analyse the results with small age bins. The peak of the reminiscence bump could be located more precisely with the help of 1-year age bins than studies with 10-year age bins have previously done. Furthermore, previous research has shown that the size of the age bins can affect the location of the reminiscence bump. In Janssen, Rubin, and St. Jacques (2011), the peak of the reminiscence bump was in the 6–10-year-old range when 1-year and 5-year age bins were used to analyse autobiographical memories that were elicited with cue words, whereas with 10-year age bins the peak was in the 11–20-year-old age bin (also see Kawasaki et al., 2011). This is a major difference, which leads to different theoretical interpretations and separates the word-cued reminiscence bump more clearly from the reminiscence bump of the most important events (e.g., Rubin & Schulkind, 1997). Thus, unless one uses more precision than has been used in the past, one can come to erroneous conclusions.

The mode of the age of the participants when the mentioned players were at the midpoint of their career is examined first. Football players are expected to be mostly named by participants who were between the ages of 16 and 20 years when the players reached the midpoint of their careers, since people tend to recall their favourite books, movies, and records from this period (Janssen et al., 2007). This outcome might, however, be biased, because adolescence is, besides childhood, the only lifetime period that was shared by all participants. The proportion of mentioned players from each decade are therefore also calculated per age cohort. Furthermore, we examine the steepness of the reminiscence bump and whether the temporal distribution of the best football players of all time consists of a recency effect. These analyses are conducted with 10-year age bins, because the

results are divided into eight groups of players or seven age cohorts, leaving us with fewer data for each analysis.

Accounts for the reminiscence bump

Although the primary goal of the study was to examine the reminiscence bump in the temporal distribution of the best football players of all time, the results might shed some light about the four accounts for the occurrence of the reminiscence bump: the biological, the cognitive, the identity-formation, and the life scripts accounts. On the basis of previous research (i.e., Janssen et al., 2007), one would expect that the reminiscence bump is located in the period in which the participants were between 15 and 20 years old. The four explanations, however, sometimes have different expectations.

The biological account assumes that the memory system works at an optimum in adolescence (e.g., Li et al., 2004; Park et al., 2002; Salthouse, 2004), which causes more memories to be stored or memories to be stored more strongly into the memory system (Janssen & Murre, 2008; Janssen et al., 2008; Rubin et al., 1998). One might recall seeing certain footballers play extremely well or badly. These specific memories are stored more efficiently in adolescence and are therefore more likely to be retrieved at later ages. According to the biological account, the reminiscence bump in the distribution of the best players is expected to be located in the period in which the participants were between 10 and 20 years old.

The cognitive account hypothesizes that there are more novel events in adolescence and early adulthood, such as the first kiss and the first driving lesson. These first-time experiences are encoded more strongly, because they are novel, and they are retrieved more often, because they are used later in life as exemplars when people experience similar events (Pillemer, 2001; Robinson, 1992). According to the cognitive account, the reminiscence bump should be located in the period in which the participants are between 5 and 15 years old, since children start to play and to follow football from those early ages (Koninklijke Nederlandse Voetbalbond, 2010).

The identity-formation (or life-narrative) account assumes that people form their identity in adolescence and early adulthood (Conway, 2005, 2009; Conway & Pleydell-Pearce, 2000; Rathbone, Moulin, & Conway, 2008; also see Fitzgerald, 1988, 1996). Many self-defining memories, which are vivid and emotional memories of personal events that have a large impact on the identity of a person (Conway, Singer, & Tagini, 2004), occur in these lifetime periods. From adolescence, young people begin to realize who they were in the past, who they currently are, and who they want to be in the future. They also start to develop a social and generational identity (Holmes & Conway, 1999) during this period. People might identify with players and teams, because they are from the same region, are successful, or have a certain image or playing style. According to the identity-formation account, the reminiscence bump is expected to be located in the period in which the participants were between 10 and 30 years old.

The final explanation for the occurrence of the reminiscence bump is the life scripts account (Berntsen & Rubin, 2002, 2004; Rubin & Berntsen, 2003). Life scripts are culturally shared expectations about the order and timing of life events in an idealized life course, which are used to process life stories (also see Bohn, 2010; Bohn & Berntsen, 2011; Janssen & Rubin, 2011; Rubin, Berntsen, & Hutson, 2009). These life scripts are used when participants are queried about the most important events from their lives, but not when they are asked to name their favourite books, movies, and records or the events that changed the world. Since football players are not a part of the life script, the reminiscence bump should be located in the same period as the temporal distribution of favourite books, movies, and records (i.e., 15–20 years) or important public events (i.e., 10–30 years).

These four accounts are, however, not mutually exclusive (Rubin et al., 1998). An early peak in the temporal distribution would therefore offer support for the cognitive account, but it would not falsify the three other accounts. A late peak would likewise offer support for the identity-formation account, but not necessarily falsify the others.

Method

Participants

The questionnaire was presented in Dutch on the website of the University of Amsterdam (<http://memory.uva.nl>). The participants could come into contact with the website in at least three ways: through search engines, links on other websites, or promotion in the traditional media (e.g., magazines, newspapers, and radio). Volunteers who had participated in other studies on the website, such as Daily News Memory Test (Meeter, Murre, & Janssen, 2005; Meeter, Ochtman, Janssen, & Murre, 2010), were also invited to participate.

There were 619 participants between the ages of 16 and 80 years who took part in the study. The majority of the participants was male (81.6%), and the average age was 47.74 years ($SD = 15.31$). The participants were divided into seven age cohorts (1926–1935, $N = 20$; 1936–1945, $N = 69$; 1946–1955, $N = 162$; 1956–1965, $N = 152$; 1966–1975, $N = 87$; 1976–1985, $N = 71$; 1986–1995, $N = 58$). The female participants were younger ($M = 42.85$, $SD = 15.56$) than their male counterparts ($M = 48.85$, $SD = 15.07$), $t(617) = 3.82$, $p < .001$. The majority of the participants had an equivalent of a college or university education (63.9%).

Materials and procedure

After the participants had registered or had logged in (when they had taken another study on the website), they were asked to name the five football players who they considered to be the best players of all time. It was emphasized that the players could be either Dutch or foreign and that they could either be still active or have retired from the game.

Before the participants named their favourite football players, they were shown a list with the names of 190 players. The list, from which the participants could choose, consisted of the 150 best football players named by FIFA (Fédération Internationale de Football Association), supplemented by players, who had won the Ballon d'Or or the Golden Boot award or who had been named best player in the Dutch competition. It was explained to the participants that they

could add names if the players that they regarded as the best players were not on the list.

Below the list, the participants could select the football players from five drop-down menus that were identical to the list or enter the names in text fields. Although the five options were numbered, participants were not asked explicitly to enter the players in a ranked order. When the participants had selected or entered the names of the players, they proceeded to the final page, where they were given the preliminary results and a short explanation about the purpose of the study.

Results

The study was conducted on the Internet (Gosling, Vazire, Srivastava, & John, 2004; Reips, 2000, 2002; Skitka & Sargis, 2006). To ensure the quality of the results, participants were allowed to take part in the study as often as they wanted. However, only their first contribution was included in the analyses. The results of participants who were younger than 16 or older than 80 years, who did not reside in the Netherlands, or who mentioned the same player more than once were also not included.

In total, 172 different football players were mentioned by the participants as one of the five best players of all time. One hundred and fifteen players were named by 5 participants or fewer, while 59 players were listed by only 1 participant. For each player, the midpoint of his playing career was calculated by comparing the years of his first and last professional games. We selected this value, because it could be established objectively for all players.¹ When the player was still active, the midpoint between the start of his career and the test was taken. All players, except one (Bep Bakhuys, whose career midpoint was 1931), reached the midpoint of their careers between the

Table 1. Twenty most frequently named players, the midpoint of their careers, and the percentage of participants that mentioned them

Name	Midpoint	Percentage
Johan Crujff	1974	86.1
Pelé	1967	55.6
Diego Maradona	1987	47.8
Marco van Basten	1988	32.3
Zinedine Zidane	1997	32.0
Dennis Bergkamp	1996	24.1
Franz Beckenbauer	1974	12.3
Eusebio	1968	12.0
Romario	1997	11.6
Lionel Messi ^a	2007	7.9
Ruud Gullit	1989	7.6
George Best	1974	7.4
Ferenc Puskas	1955	7.3
Abe Lenstra	1947	7.1
Cristiano Ronaldo ^a	2005	6.6
Ronaldinho ^a	2004	6.3
Ronaldo ^a	2001	5.7
David Beckham ^a	2001	5.3
Michel Platini	1980	5.2
Alfredo Di Stéfano	1955	4.7

^aStill active when the test was taken.

1940s and 2000s. The 20 most frequently named players are given in Table 1 along with their career midpoints and the percentage of participants that mentioned them. Johan Crujff, Pelé, and Diego Maradona were mentioned most frequently; 86.1% of the participants named Crujff, 55.6% named Pelé, and 47.8% named Maradona.

Subsequently, the peak of the temporal distribution of the best football players was located. We looked at the number of mentions as a function of the age of the participants at the midpoint of the nominated players' careers (see Figure 1). These ages ranged from -43 to 77 years. The negative age refers to a situation in which a young adult

¹ If one compares the career midpoint of the 10 most frequently mentioned football players (who represent 64.3% of the data) with their performances at the World Cup or European Cup, the career midpoint seems a reasonable approximation for the peak of a player's career. Johan Crujff (1974) reached in 1974 the final of the World Cup, Pelé (1967) won in 1958, 1962, and 1970 the World Cup, Diego Maradona (1987) won in 1986 the World Cup, Marco van Basten (1988) won in 1988 the European Cup, Zinedine Zidane (1997) won in 1998 the World Cup, Dennis Bergkamp (1996) reached in 1998 the semifinal of the World Cup, Franz Beckenbauer (1974) won in 1974 the World Cup, Eusebio (1968) reached in 1966 the semifinal of the World Cup, and Romario (1997) won in 1994 the World Cup. Lionel Messi (2007) is at this moment only 23 years old and has not reached further than the quarter-finals at the World Cup.

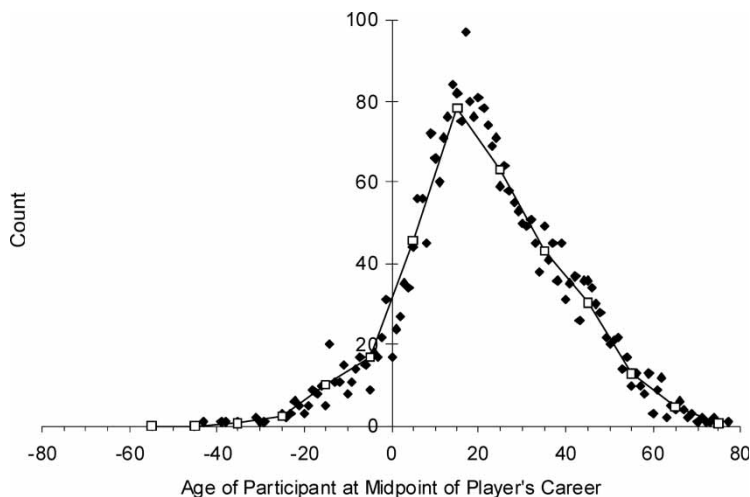


Figure 1. The number of players as a function of the age of the participants at the midpoint of the player's career. Events are grouped per year (solid diamonds) or per 10 years (hollow squares).

nominated a player who was active before he was born, while the positive age refers to a situation in which an older adult nominated a player who was still active. The mode, median, and mean of these ages were examined. Of these three statistics, the mode is the most appropriate, because the mean and, to a lesser extent, the median can be disproportionately affected by the recall of currently active players. The mode of these values was 17 years, the median was 20.0 years, while the mean was 21.89 years ($SD = 17.68$).

The number of players as a function of the age of the participants is also displayed with 10-year age bins in Figure 1. To keep the numbers shown in the figure comparable, the number per year is displayed for both plots. For the 10-year age bins, the actual number of players is therefore 10 times what is shown. Unlike previous studies (e.g., Janssen et al., 2011; Kawasaki et al., 2011), the use of larger age bins did not cause a shift in the location of the reminiscence bump. Almost half the nominations (45.7%) fell in the period in which the participants were between 11 and 30 years old. Participants named more players from the period in which they were between 11 and 30 years old ($M = 2.28$, $SD = 1.15$) than from a comparable period in which they were between 1 and 10 and between 31 and 40 years old ($M = 1.44$, $SD = 1.03$), $t(618) =$

11.18, $p < .001$. Furthermore, participants mentioned more players from the second decade ($M = 1.26$, $SD = 1.00$) than from the third decade of their lives ($M = 1.02$, $SD = 0.95$), $t(618) = 3.91$, $p < .001$. Finally, there was no significant difference between the number of players from the period in which the participants were between 11 and 15 years old ($M = 0.66$, $SD = 0.79$) and that from the period when they were between 16 and 20 years old ($M = 0.60$, $SD = 0.76$), $p = .21$.

The results were also analysed (a) only with active players, (b) without active players, (c) only with Crujff, Pelé, and Maradona, (d) without Crujff, Pelé, and Maradona, (e) only with Dutch players, (f) without Dutch players, (g) only with male participants, and (h) only with female participants. These analyses yielded similar results for the modes, which are given in Table 2. The modes all ranged between 15 and 21 years. The medians and means ranged between 16.0 and 24.0 years and between 14.94 and 26.13 years, except when only active players were analysed ($Mdn = 36.0$; $M = 35.79$).

The previous analyses showed that participants mainly recalled players who reached their peak when the participants were adolescents and young adults. There might, however, be a tendency to nominate players from adolescence, since this period is, alongside childhood, the only lifetime

Table 2. The number of observations, the mode, the median, the mean, the minimum value, and the maximum value for each selection criterion

Selection criterion	N	Mode	Median	Mean	Min	Max
All results	3,095	17	21.0	21.89	-43	77
Only active players	457	19	36.0	35.79	7	77
Without active players	2,638	17	19.0	19.48	-43	69
Only Pelé, Crujff, and Maradona	1,173	17	16.0	14.94	-25	58
Without Pelé, Crujff, and Maradona	1,922	15	24.0	26.13	-43	77
Only Dutch players	1,340	21	20.0	20.81	-43	73
Without Dutch players	1,755	17	21.0	22.72	-35	77
Only male participants	2,525	17	21.0	22.24	-43	77
Only female participants	570	17	19.0	20.35	-39	69

period from which all participants could possibly recall football players. A more appropriate question might, therefore, be whether players are also mentioned most frequently by participants who were adolescents and young adults when those players reached their career midpoints. This way of analysing the results is similar to the method used by Schuman (e.g., Schuman et al., 1998; Schuman & Scott, 1989).

First, the results of the three most frequently mentioned players were investigated. We asked whether they were most often listed by participants who were adolescents and young adults when those players reached their career midpoints. Participants were grouped into seven age cohorts of 10 years (1926–1935, 1936–1945, etc.). For each age cohort, the proportion of mentions for each player as a function of the total number of participants was calculated. For example, the 162 participants who were born between 1946 and 1955 named Pelé 110 times (.679), Crujff 148 times (.914), and Maradona 75 times (.463). These results were used to establish distributions of the proportions of mentions of the three players, which are given in Figure 2. Since we expected the functions to peak among participants who were between 16 and 20 years old when the players reached the midpoint of their career, 15 years were added to the year of birth of the participants. The above-mentioned results of the participants who were born between 1946 and 1955 are thus displayed in Figure 2 as 1961–1970.

Pelé was more frequently mentioned by participants who were born between 1946 and 1955

($M = .68$) than by participants from other cohorts ($M = .51$), $t(617) = 3.71$, $p < .001$. When Pelé reached the midpoint of his career in 1967, these participants were between 12 and 21 years old. Although Johan Crujff was often named by participants who were born before 1956, he was more frequently listed by participants who were born between 1956 and 1965 ($M = .95$) than by participants from other cohorts ($M = .83$), $t(617) = 3.57$, $p < .001$. When Crujff reached the midpoint of his career, these participants were between 9 and 18 years old. The results of Crujff seem to be influenced by a ceiling effect. Participants who were born between 1956 and 1965 did not name him more often than participants who were born before 1956 ($M = .91$), $p = .20$. Diego Maradona was most frequently mentioned by participants who were born between 1966 and 1975 ($M = .55$), but this proportion was not significantly higher than the proportion of all other cohorts ($M = .47$), $p = .14$.

Then, the results of all players were examined. Participants were again grouped into age cohorts of 10 years, while every player was grouped into the decade in which his career midpoints was located (i.e., 1930s, 1940s, etc.). For each age cohort, the proportion of players from each decade as a function of the total number of mentions was calculated. These results were used to establish functions for the players of each decade, which are given in Figure 3. To make the figure easier to read, the eight distributions have been divided over two panels, and 15 years have been added to the year of birth of the participants.

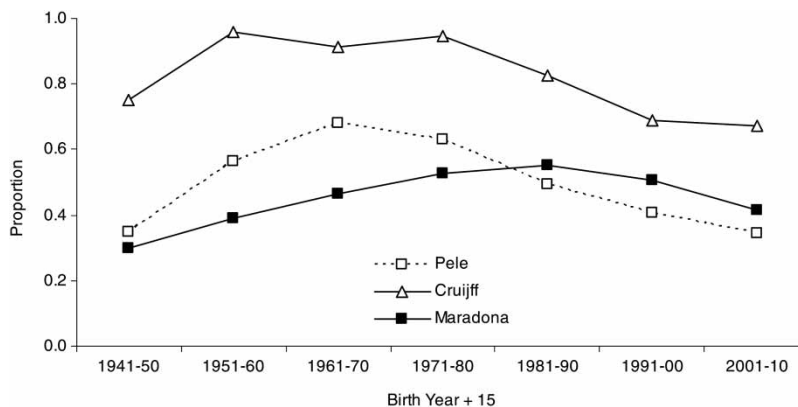


Figure 2. Proportion of mentions of Pelé, Cruyff, and Maradona per age cohort.

A reminiscence bump was found in each distribution, but it was not located in the expected age cohort for two groups of players: players from the 1930s and players from the 1990s. There was only one player who reached the midpoint of his career in the 1930s, who was only named by 5 participants who were born between 1926 and 1935 ($M = .010$) or between 1936 and 1945 ($M = .012$). The peak is in a later cohort than one would expect, but there were actually no participants in the study who were 15 years old in the 1930s. Players whose career midpoint was located in the 1990s were most frequently named by participants who were born in the late 1980s and the early 1990s. The distribution peaked in a later cohort than was expected, but there was no difference between the age cohort that had the highest proportion ($M = .248$) and the age cohort in which the highest proportion was expected ($M = .242$), $p = .85$. The proportion of mentions by the predicted cohort (who were born between 1976 and 1985) was, however, significantly higher than the proportion of mentions by all other cohorts ($M = .138$), $t(617) = 6.89$, $p < .001$.

For all other groups of players, the distributions peaked in the age cohorts in which we expected the highest proportion to be. Players from the 1940s were most frequently named by participants who were born in the late 1920s and the early 1930s. The proportion of mentions of players from this period by participants of this cohort ($M = .070$) was significantly higher than the proportion of

mentions by participants of other cohorts ($M = .013$), $t(617) = 4.67$, $p < .001$. Players whose career midpoint was located in the 1950s were most frequently named by participants who were born between 1936 and 1945. The proportion of mentions by this cohort ($M = .104$) was higher than the proportion of mentions by other cohorts ($M = .020$), $t(617) = 8.63$, $p < .001$.

Players from the 1960s and 1970s were most frequently named by participants who were born in the late 1940s and the early 1950s and in the late 1950s and the early 1960s. The proportion of mentions of players from the 1960s by participants of the predicted cohort ($M = .223$) was significantly higher than the proportion of mentions by the other cohorts ($M = .138$), $t(617) = 6.89$, $p < .001$. Players from the 1970s were more frequently listed by participants of the predicted cohort ($M = .287$) than by participants from the other cohorts ($M = .230$), $t(617) = 4.54$, $p < .001$. Players whose career midpoint was located in the 1980s or 2000s were mentioned most frequently by participants who were born between 1966 and 1975 and between 1986 and 1995. The two functions peaked in the age cohorts in which we expected them to peak. The differences between the proportions of these selected cohorts and the other cohorts ($M = .299$ vs. $M = .195$; $M = .362$ vs. $M = .134$) were significant, $t(617) = 5.80$ and $t(617) = 9.11$, $p_s < .001$.

To examine the steepness of the reminiscence bump, we compared the proportion of mentions by

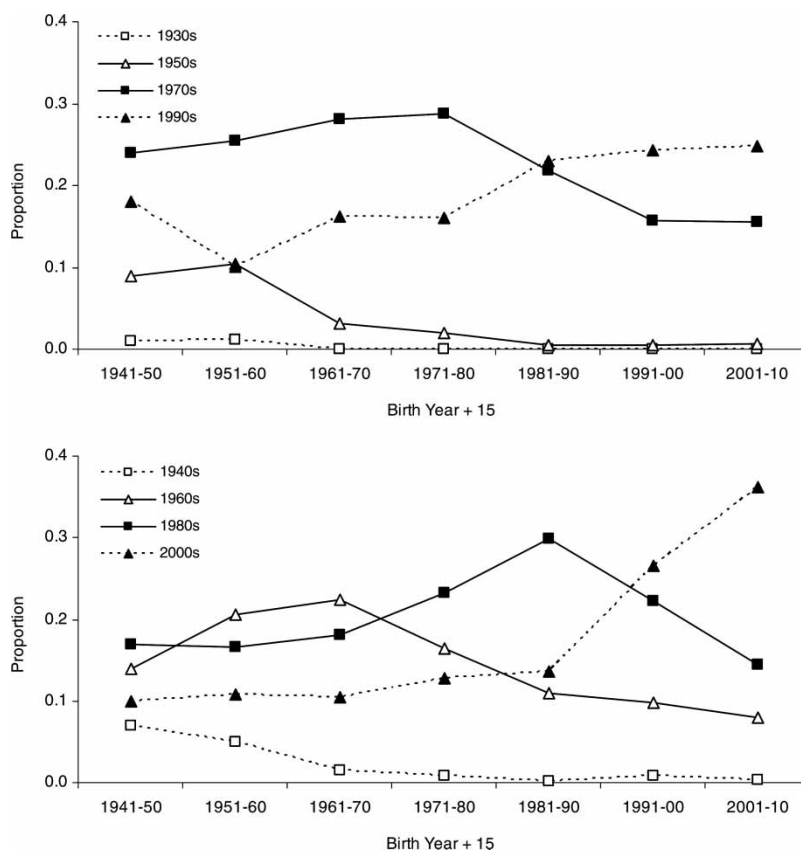


Figure 3. Proportion of mentions of players from the 1930s, 1950s, 1970s, and 1990s (top panel) and the 1940s, 1960s, 1980s and 2000s (bottom panel) per age cohort.

participants in the predicted age cohort with the proportions of mentions by participants in the preceding and the subsequent age cohorts. In the first two comparisons, there were, however, no preceding age cohorts. For players from the 1930s and 1940s, there were no significant differences between the predicted cohort and the subsequent cohort, $p = .89$ and $p = .39$. For players who reached the midpoint of their career in the 1950s, there was no difference between the predicted and the preceding cohort ($p = .69$), but the proportion of the predicted cohort ($M = .104$) was significantly higher than the proportion of the subsequent cohort ($M = .032$), $t(229) = 5.04$, $p < .001$.

Similar results were found for players whose career midpoint was located in the 1960s and 1970s. There were no differences between the

predicted and the preceding cohorts ($p = .42$, $p = .74$), but the proportions of the predicted cohorts ($M = .223$, $M = .287$) were significantly higher than the proportions of the subsequent cohorts ($M = .164$, $M = .218$), $t(312) = 3.86$ and $t(237) = 3.76$, $p_s < .001$. While the proportion of players from the 1980s mentioned by participants from the predicted cohort ($M = .299$) was significantly higher than the proportions of both the preceding ($M = .233$) and the subsequent ($M = .223$) cohorts, $t(237) = 3.26$, $t(156) = 2.64$, $p_s < .01$, the proportion of players from the 1990s mentioned by participants from the predicted cohort was not, $p = .64$ and $p = .85$. For the most recent group of players, there was no subsequent age cohort. The proportion of the predicted cohort ($M = .362$) for players from the 2000s were, however, significantly

higher than the proportion of the preceding cohort ($M = .265$), $t(127) = 2.37$, $p < .05$.

Lastly, we examined whether the temporal distributions of the seven age cohorts were affected by an increased recall of active players by comparing the number of players from the 1990s with the number of players from the 2000s. Two cohorts (1946–1955, 1966–1975) mentioned more players from the 1990s ($M = .162$, $M = .230$) than from the 2000s ($M = .105$, $M = .136$), $t(161) = 3.10$, $p < .01$, $t(86) = 3.73$, $p < .001$, while four cohorts (1926–1935, 1936–1945, 1956–1965, 1976–1985) listed similar numbers of players from both decades ($p = .12$, $p = .76$, $p = .08$, $p = .55$). Only the youngest cohort (1986–1995) mentioned more players from the 2000s ($M = .362$) than from the 1990s ($M = .248$), $t(57) = -2.41$, $p < .05$.

Discussion

The reminiscence bump reflects a tendency to recall more personal events from adolescence and early adulthood than from adjacent lifetime periods (Rubin et al., 1998; Rubin et al., 1986). The robustness of the effect was examined in the present study by asking participants to name the five best football players of all time. We found that the reminiscence bump could also be located in the temporal distribution of judgements about the qualities of football players. Participants frequently mentioned players who reached the midpoint of their career when they were adolescents or young adults.

The results were very strong. The mode of the age of the participants at the midpoint of the nominated players' careers was 17. The mode did not change much when the different selection criteria were used. It remained at approximately the same value when the results were analysed only with players who were still active or with players who had retired, with the most popular or with less popular players, with Dutch or with foreign players, and with male or with female participants. Although the participants did not frequently mention active players (14.8%), the recall of active players affected the means and medians in certain situations disproportionately.

There was, however, a clear and strong bias to mention football players from adolescence, since this lifetime period was, alongside childhood, the only period that was shared by all participants. It was therefore more appropriate to examine whether each player was also mentioned most frequently by participants who were adolescents and young adults when that player reached the midpoint of his career. With these analyses, it was found that participants who were between 12 and 21 years old when Pelé reached the midpoint of his career mentioned him most often. Johan Crujff was most often mentioned by participants who were between 9 and 18 years old when he reached the midpoint of his career. Reminiscence bumps could also be identified when players were grouped per decade. The peaks of the distributions were located in the expected age cohort except for players from the 1930s and the 1990s. For the first group of players, there were actually no participants in the study who were 15 years old in the 1930s. For the players from the 1990s, participants who were born between 1986 and 1995 more frequently mentioned them than participants who were born between 1976 and 1985. For the six other groups of players, the age cohort that was 15 years old during the decade most frequently mentioned them. These two sets of additional analyses showed that, although the bias indeed enhanced the size of the reminiscence bump, it did not change the location of the reminiscence bump.

Recent studies (e.g., Janssen et al., 2011; Kawasaki et al., 2011) had found that when 1-year and 5-year bins were used for word-cued memories, the peak was in the 5-to-10-year age range, whereas with 10-year age bins it was in the 10-to-20-year age range, but there was no such shift in the current data set. Nonetheless, the mode at 17 years and the peak in the 10-to-20-year age bin is earlier than the reminiscence bump in the temporal distribution of the most important events from people's lives (e.g., Rubin & Schulkind, 1997), which occur in a different decade. Whether this is due to the increased precision of the present study, which was afforded by having more participants, requires further study with the original domains. For example, do people recall more important personal events from the period in

which they were between 20 and 25 or between 25 and 30 years old?

We also examined the steepness of the reminiscence bump. Because there was much agreement about the qualities of the players across the age cohorts (e.g., 86.1% of the participants listed Crujff), the proportions in the cohorts for which we predicted and often found the highest values were sometimes not significantly larger than the proportions in the immediate preceding and following cohorts. There seemed to be a tendency for players from the 1950s, 1960s, and 1970s to also be named frequently by participants who were around 25 years old when the players reached the midpoint of their career. These players were less often listed by participants who were around 5 years old when the players reached their career midpoint. These results correspond well with the ages of the participants at the midpoint of the nominated players' careers. The mode of the ages was 17, which is closer to the 20–30-year age range than to the 0–10-year age range.

In the analyses, active players were only included in the temporal distribution of players who reached their career midpoint in the 2000s. There were no active players in the other groups. The temporal distributions of the age cohorts were also not affected by an increased recall of active players. Of the seven cohorts, two cohorts mentioned more players from the 1990s than from the 2000s, while four cohorts listed similar numbers of players from both decades. Only the youngest cohort mentioned more players from the 2000s than from the 1990s, but the recency effect coincides with the reminiscence bump for these participants (cf. Janssen et al., 2005). The absence of an increased recall of active players suggests that the temporal distribution of the best players of all time is more similar to the distribution of important events than to the distribution of word-cued memories (Rubin & Schulkind, 1997).

Although the main goal of the study was to investigate the robustness of the reminiscence bump, the results shed some light about the four accounts for the occurrence of the phenomenon. The outcome of the study was predicted by all accounts except the cognitive account. According

to this explanation, the reminiscence bump should have been located in the period in which the participants are between 5 and 15 years old, since children start to play and follow football from those early ages (Koninklijke Nederlandse Voetbalbond, 2010). The results could not distinguish between the three other accounts, which predicted that the reminiscence bump would occur either in the period in which the participants were between 10 and 20 years old (biological account) or in the period when they were between 10 and 30 years old (identity-formation and life scripts accounts).

The location of the reminiscence bump does depend on the measure used to reduce the player's career to a single year. We selected the midpoint, because it could be established objectively for all players, whereas other measures, such as years in which the player won a major award (i.e., the Ballon d'Or or the Golden Boot) could not be applied to every player. If the first half of the player's career would have had more impact on the decision to regard the player as one of the best players of all time (or if we would have taken the year of his first professional game), the reminiscence bump would have been located at earlier ages. If the second half would have had more impact on the decision (or if we would have taken the year of his last professional game), the reminiscence bump would have been located at later ages. There is in the literature no evidence that a participant's preference of a particular player would occur before or after the player's career midpoint, but the absence of the recency effect suggests that the decision to consider a football player as one of the five best players tends to be made after his career has ended.

It is possible that the reminiscence bump is caused by a decrease in people's interest in football across the life span. We did not measure present or past interest in football in this study, but interest in literature was measured in a comparable study, in which participants were asked to name their three favourite books, movies, and records (Janssen et al., 2007), by the number of books recently read. This number increased across the life span, but a reminiscence bump was still found in the temporal distribution of favourite books.

The results of this study are another example of the robustness of the reminiscence bump phenomenon. It had previously been found outside the autobiographical memory domain in the temporal distribution of memory for public events (Holmes & Conway, 1999; Howes & Katz, 1988; Janssen et al., 2008; Rubin et al., 1998; Schuman et al., 1997) and favourite books, movies, and records (Holbrook & Schindler, 1989, 1996; Janssen et al., 2007; Larsen, 1996; Schulkind et al., 1999; Schulster, 1996).

The present study could identify precisely at which age the temporal distribution peaked. As it becomes easier to test large samples, the results of studies will be more precise and accurate. It should then be easier to differentiate between the theoretical accounts for the reminiscence bump, although the different explanations are not always explicit about the period in which they expect the temporal distributions to peak. The accounts also do not always define in which data sets they expect and in which data sets they do not expect to find a reminiscence bump. Another problem is that the four accounts are not mutually exclusive (Rubin et al., 1998). The identity-formation account assumes that adolescence and early adulthood consists of many self-defining memories (Conway et al., 2004). These self-defining memories might be similar to the life story events in the cultural life script (Berntsen & Rubin, 2002, 2004; Rubin & Berntsen, 2003). It would be helpful if the accounts can be made clearer about the ways that they are different from other explanations.

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