This is the accepted manuscript (post-print version) of the article.
The content in the accepted manuscript version is identical to the final published version, although typography and layout may differ.

How to cite this publication
Please cite the final published version:


Publication metadata

Title: The development of past and future life stories in adolescence: Overall emotional tone, coherence and life script events
Author(s): Stine B. Ramsgaard & Annette Bohn
Journal: Scandinavian Journal of Psychology
DOI/Link: https://doi.org/10.1111/sjop.12691
Document version: Accepted manuscript (post-print)

"This is the peer reviewed version of the following article: Ramsgaard, S. B. & Bohn, A. (2021). The development of past and future life stories in adolescence: Overall emotional tone, coherence and life script events. Scandinavian Journal of Psychology, 62(2), 150-158, which has been published in final form at https://doi.org/10.1111/sjop.12691. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions."

General Rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

If the document is published under a Creative Commons license, this applies instead of the general rights.
The Development of Past and Future Life Stories in Adolescence: Overall Emotional Tone, Coherence and Life Script Events

Stine Breum Ramsgaard and Annette Bohn, Center on Autobiographical Memory Research (CONAMORE), Department of Psychology and Behavioral Sciences, Aarhus University, Aarhus/ Denmark

Corresponding author:
Annette Bohn
Department of Psychology and Behavioral Sciences
Aarhus University
Bartholins Alle 11
8000 Aarhus C
anetboh@psy.au.dk
Abstract

Research has shown that identity in adolescence takes the shape of a coherent life story that integrates the past with the present self and provides meaning and purpose in the person’s life. One stable feature of narrative identity identified in adults is emotional tone. Here, the development of emotional tone in life stories was investigated across childhood and adolescence. A total of 142 adolescents aged 10 to 14 years wrote about their past weekend, their past and future life stories and generated a cultural life script. Across age groups, adolescents told past life stories that were overall mixed (both positive and negative) or moderately positive in emotional tone, and future life stories that were positive or highly positive. In relation to life story development, we replicated findings on age-related development of life story coherence in both past and future life stories in 10 to 14 year olds. Lastly, the study highlights the link between life story coherence and cultural life script abilities. Cultural life script typicality was linked to life story coherence for both past and future life stories and across all age groups, and a majority of events mentioned in future life stories overlapped with cultural life script events.

Keywords: Life story development, emotional tone, life story coherence, adolescence, cultural life script
The Development of Past and Future Life Stories in Adolescence: Overall Emotional Tone, Coherence and Life Script Events

People are storytellers by nature. To be able to understand who we are and to be able to tell this to other people, we need to have a life story (McAdams, 2006). A growing amount of research has highlighted that the ability to remember one’s past and to imagine one’s future meaningfully and coherently in the form of a life story is central to identity, the sense of self and for planning the future (e.g., Bluck & Alea, 2008; Bohn & Berntsen, 2008; Conway & Pleydell-Pearce, 2000; Habermas & Bluck, 2000; McAdams & McLean, 2013). Remembering the past and imagining the future have been proposed to be related processes (e.g., for review see D’Argembeau, 2012; Schacter & Addis, 2007; Szpunar, 2010) that develop in parallel across childhood and adolescence (for review, see Bohn & Berntsen, 2013). Despite similarities, several studies have shown important differences between remembering the past and imagining the future (e.g., Berntsen & Bohn, 2010; Bohn & Berntsen, 2013: Grysman, Prabhakar, Anglin & Hudson, 2013; Newby-Clark & Ross, 2003; Rasmussen & Berntsen, 2013; Özbek, Bohn & Berntsen, 2017). Specifically, people imagine future events as more positive and idyllic than past events, and rely more on schema-based construction and content when imagining the future, suggesting that past and future might serve different functions for emotion regulation and identity (e.g., Rasmussen & Berntsen, 2013). Usually, research on personal memories and imagined future events as well as past and future life stories has measured emotionality by event valence, i.e. by how positive or negative an event is. Here, we will argue that by including a measure of overall emotional tone, we might gain deeper insight into the role of emotion in past and future life stories in adolescence.

Emotional Tone in Life Stories

A few studies have investigated emotional tone in vulnerable adolescents’ life stories (Ramsgaard & Bohn, 2019; Ramsgaard, Bohn & Thastum, 2019). However, no study has yet
investigated the development of overall emotional tone of past and future life stories in adolescence. Examining overall emotional tone in adolescents will make it possible to gain knowledge on whether it follows the same developmental path as other life story variables such as length, coherence (e.g., Bohn & Berntsen, 2008, 2013; Köber & Habermas, 2017; Habermas & de Silveira, 2008; Habermas & Paha, 2001;) and especially valence (Bohn & Berntsen, 2008, 2013). Further, because participants in this study will both produce past and future life stories, it will be possible to investigate individual differences related to emotional tone in life stories (McAdams et al., 2004, 2006).

Life stories consist of both positive and negative personally significant life events and their meaning in the context of the person’s life. Both negative and positive emotions and events are important for understanding oneself, creating meaning and narrative coherence (e.g., Fivush, Berlin, Sales, Mennuti-Washburn & Cassidy, 2003a; Reese Bird & Tripp, 2007; Pennebaker & Seagal, 1999). Research in autobiographical memory has established that children, adolescents and adults all tend to remember their pasts as overall positive, but to imagine their futures to be even more positive than their pasts (e.g., Berntsen & Bohn, 2010; Bohn & Berntsen, 2013; Grysman et al., 2013, Newby-Clark & Ross, 2003; Rasmussen & Berntsen, 2013; Özbek et al., 2017). The degree of positivity in life stories has previously been based on the valence of life story events (Bohn & Berntsen, 2008, 2013) by focusing on the number of positive and negative events individuals included in their life stories. Bohn and Berntsen (2013) found that past life stories contained more negative events than future life stories, and that future life stories consisted almost exclusively of positive events. An expansion of the understanding of valence and emotional tone of life stories is important as earlier studies in children and adolescents have found that narrating and reflecting on both positive and negative events helps to create a healthy adult identity (Bohanek & Fivush, 2010).
In the current study, we explore this notion by including a measure of overall emotional tone (McAdams et al., 2004). According to McAdams and colleagues, every story has a characteristic emotional tone ranging from extremely negative to extremely positive. Emotional tone refers to the overall emotional feel of the story (McAdams et al., 2004). It differs across individuals with some individuals having an overall positive and optimistic outlook in their stories, and others have a more negative outlook (McAdams et al., 2004). In adults, emotional tone of narratives has been found to be a relatively stable feature of narrative identity (McAdams et al., 2006; Thomsen, Jensen & Mehlsen, 2019).

It has previously been argued that emotional tone is not only a product of the type and valence of events experienced, but also related to interpretation. For example, emotional tone of specific narratives and life story chapters has been linked to personality traits, with more anxious and neurotic individuals telling more negative narratives (McAdams et al., 2006) and people high on extraversion and conscientiousness and low on neuroticism having more positive personal past life story chapters (Thomsen & Pillemer, 2017). Further, a recent study found that adolescents with an anxiety disorder told both past and future life stories that were more negative in emotional tone than community controls’ (Ramsgaard et al., 2019), despite the fact that their stories did not differ in the percentages of both positive and negative events, specifically, even though the adolescents with anxiety disorders did not mention more negative events in their past life stories than the control group, their past life stories were negative in overall emotional tone, whereas the interpretation of the personal past, and a negatively biased perception of the personal future. Thus, the findings of equally many negative events in past life stories of both groups further provide some support to the idea that it is not valence, i.e., the number of negative events anxious adolescents experience (or report) that colour their life stories, but rather the interpretations of these experiences.
In another study (Ramsgaard & Bohn, 2019), children of traumatized refugee parents reported fewer positive events in their past and future life stories, but at the same time did not have a more negative emotional tone in their life stories than community controls. Again, this finding supports the notion that it is not only the valence of experienced events, but the interpretation and meaning of the events in light of a person’s current life situation that is related to the emotional tone of the life stories. Taken together, these results suggest that the emotional tone of life stories is not entirely based on the number of positive and negative events in the life story. In the present study, we explore the role and development of overall emotional tone in life stories in three age groups across adolescence.

**Development of Life Stories**

Research has shown that it is not until late middle childhood and adolescence, that youths develop the ability to produce a coherent past (e.g. Bohn & Berntsen, 2008; Habermas & de Silveira, 2008) and future life story (Bohn & Berntsen, 2011, 2013). According to Habermas and Bluck (2000), younger children have not acquired the ability to coherently integrate several events into a life story. It is not until around age 12 that adolescents begin to use autobiographical reasoning, which is the ability to link together single life events in a way that defines the persons’ identity and creates a meaningful story (Habermas & Bluck, 2000; Habermas & Reese, 2015).

Habermas and Bluck (2000) hypothesized that a coherent life story is based on four kinds of coherences: three types of narrative coherence (temporal, thematic and causal) and, specific to life stories, cultural coherence. Cultural coherence refers to “shared normative expectations concerning appropriate and probable life sequences” (Habermas & Bluck, 2000, p.
750) and helps define how a life story should unfold within a given culture (e.g., Bohn &
Berntsen, 2014; Habermas, 2007; Köber, Schmiedek & Habermas, 2015, Köber & Habermas,
2017). Importantly, Habermas and Bluck proposed that cultural coherence is specific to life
stories, whereas the other three narrative coherence types relate to all types of narratives. In
relation to this, McAdams defines life stories as “psychosocial constructions, co-authored by the
person himself or herself and the cultural context within which that person’s life is embedded
and given meaning.” (McAdams, 2001, p.100). Thus, life stories are made up of
autobiographical memories that are selected and combined by the individual to form a coherent
personal narrative in the framework of the individual’s cultural context (Bohn, 2011). In the
same vein, life stories are a highly distinct format that requires more selective and demanding
processes than describing a single event (Habermas & Reese, 2015). In line with these notions,
the ability to tell coherent life stories develops later than the ability to narrate single event

Only few studies have investigated the development of entire life stories in adolescence.
Habermas and colleagues collected guided past life stories in German samples ranging from age 8
to 69 years (Habermas & de Silveira, 2008; Habermas & Paha, 2001; Köber & Habermas, 2017;
Köber et al., 2015;). Habermas and colleagues looked at the development of temporal, causal and
thematic coherence in past life stories in adolescents from age 8 to 69 year (Habermas, Ehlert-
Lerche & de Silveira, 2009; Köber & Habermas, 2017; Köber et al., 2015). Results showed an
age-related increase in temporal coherence from ages 8 to 20 years (Habermas et al., 2009; Köber
et al., 2015), but a stable level after age 20 (Köber et al., 2015). Bohn and Berntsen (2008, 2013)
collected unguided past and future life stories in two Danish samples ranging from age 9 to 14
years and 10 to 15 years. These two studies are described in more detail below, as the current
study wishes to replicate and expand their findings. Finally, in an American sample of 10 to 14
year olds (Steiner & Pillemer, 2018), no age related increase in life story coherence was found in unguided past life stories, unlike in the other studies. However, life story coherence had only been rated dichotomously as either overall not coherent or mostly chronologically coherent. These two categories seem too broad to capture the development of life story coherence. Generally, across studies, an increase in life story coherence between late-middle childhood and adolescence has been found.

In the two Danish studies, Bohn and Berntsen (2008, 2013) measured overall life story coherence in entire life stories in adolescents. They did not measure temporal, thematic and causal coherence, but developed a measure of overall life story coherence (described in detail below in the method section). They did so, because they were interesting in the role of the one type of coherence specific to life stories – cultural coherence. Thus, the studies also included narratives of single autobiographical events as a baseline measure to differentiate between general narrative ability (i.e. temporal, causal and thematic coherence) and the ability to tell and overall coherent life story – i.e. temporally, causally, thematically and culturally coherent (see Bohn, 2011 for a more thorough discussion).

In the first study, Bohn and Berntsen (2008) investigated the theoretical claims that children cannot tell a coherent past life story before adolescence and that cultural coherence is specific to life stories (Habermas & Bluck, 2000) in three groups of pupils (on average 9½ years, 12 years, and 14½ years old). In a follow-up study, it was investigated whether the ability to imagine a future life story develops in parallel with past life stories (Bohn & Berntsen, 2013) in four groups of pupils (on average 10, 12, 13, and 14½ years old). Results showed that both past and future life stories developed across age with older adolescents telling life stories that were more coherent than the younger groups. Across age groups, future life stories were as coherent as past life stories. Results from the two studies further showed that cultural coherence was uniquely important for the development of a coherent life story whereas the ability to coherently narrate a single event story was independent of cultural life script abilities (Bohn & Berntsen, 2008, 2013), which will be described below).

Cultural life scripts are semantic knowledge about the expected order and timing of important transitional life events within a given culture (Berntsen & Rubin, 2004). Life scripts
represent a prototypical life and guide how a life in a given culture should ideally be lived. Cultural life scripts are dominated by positive events expected to happen in adolescence and early adulthood (Berntsen & Rubin, 2004), and they help organize and make sense of one’s personal past, but also provide knowledge of what to expect in the future and to imagine one’s personal future positively (e.g., Bohn & Berntsen, 2014). Knowledge of the cultural life script is uniquely related to life stories in that it helps structure life stories and thereby contributes to the overall coherence of the life story (Bohn & Berntsen, 2008; 2013; Habermas & Reese, 2015).

The Present Study
The present study involved adolescents (aged 10 – 14 years old), divided into three groups (on average 10½, 13, and 14½ years old). We chose these age groups because life story abilities have been found to develop across these age groups (Bohn & Berntsen, 2008, 2013; Habermas & de Silveira, 2008; Habermas & Paha, 2001; for review see Habermas & Reese, 2015). Further, we wanted to expand the existing literature to include a measure of overall emotional tone of life stories in adolescence and therefore chose to include roughly the same age groups as in previous studies. The present study has two overall aims. The first aim is to investigate the development of emotional tone in past and future life stories across adolescence. The second aim is to replicate earlier findings on the development of past and future life stories across adolescence.

Hypotheses
We have two clusters of hypotheses. The first one is concerned with Past vs Future Life Stories, the second one with Development across Age Groups.

Past vs Future Life Stories. We expect future life stories to be more positive in their overall emotional tone than past life stories, and we expect to find a relation between overall emotional tone and the percentages of positive and negative events included in the life stories.
We expect future life stories to contain almost exclusively positive events. In relation to this, we expect positive correlations between emotional tone and valence, and between emotional tone in past and future life stories. Based on earlier findings that imagining the future relies on schema-based construction and is less detailed than the past, we expect future life stories to be shorter and less coherent than past life stories and to contain more life script events.

Development across Age Groups. In relation to life story coherence, we expect to replicate findings on an age related development of life story coherence with younger participants producing shorter and less coherent life stories than older ones. Based on our expectation to find a positive relation between valence and emotional tone, and on earlier results of no age related differences in the percentage of negative events in life stories (Bohn & Berntsen, 2013), we expect no differences in overall emotional tone in life stories across age groups. Further, we expect younger adolescents’ cultural life scripts to be less typical than older ones, and life stories to contain a lower percentage of life script events in younger adolescents. Finally, we expect past and future life story coherences, but not single event story coherence, to be related to the degree of adult-like typicality of cultural life scripts.

Method

Participants

Participants were 142 middle-class children and adolescents with a culturally homogenous background from a comprehensive school. There were 50 fourth graders (28 boys; Mage = 10.53, SD = .29), 35 sixth and seventh graders (18 boys, Mage = 13.17, SD = .66) and 57 eight graders (26 boys, Mage = 14.70, SD = .35). Originally, it was planned to include ninth and tenth graders in the study, but due to logistic problems, data of only 20 participants were collected, and therefore, they are not part of the final study, and data from these two class grades will not be reported in the article. The study was approved by the Danish Data Protection
Agency and the Scientific Ethical Committee of Region Midtjylland.

**Procedure**

Parents were notified about the study through a letter, which the first author handed out to the children during class. Parents signed an informed consent form, and a separate form allowing citations from the stories. Data collection took place during regular school sessions in each class grade. The first author introduced the study, instructed the class, read the instructions from the questionnaire for all four parts aloud to the class, and answered all questions. Participants were informed that participation was voluntary and that they could stop at any point. They were told not to worry about handwriting or spelling when writing the stories and that neither teacher nor parents would see their responses. The participants could write either on a tablet or by paper and pencil. All participants received a cinema ticket for participating in the study. Based on previous work (Bohn & Berntsen, 2008, 2013) the following written data were collected: (1) A report about the past weekend (single event story); (2) a past life story; (3) a future life story; and (4) a cultural life script. The order of the four tasks was always the same and the cultural life script was presented last to prevent the task from possibly influencing answers on the other three tasks. For the first task, participants were asked to write about an event that had happened during the last weekend. These single event stories functioned as a baseline measure of narrative coherence to compare the ability to coherently write about a single autobiographical memory about relatively unemotional events in all age groups (Bohn & Berntsen, 2008, 2013). For past life story, instructions were: "Think about what has happened in your life since you were born and up to now. You can for example write about the most important things in your life, or what changes have happened in your life since you were born and up to now. Imagine that you are writing the story of your life to someone who would like to know something about you and the things that have happened in your life." (Bohn & Berntsen, 2013, p. 1235).
For future life story, instructions were: “Think about what could happen in your life from now and until you’ll die. You can for example write about the most important things that will happen in your life, and what changes that will happen in your life from now on and until you’ll die. Imagine that you are writing the story of your future to someone who would like to know something about you and the things that you think will happen in your future” (Bohn & Berntsen, 2013, p.1235).

Cultural Life Script. Following earlier work on cultural life scripts in adults and youths, participants were asked to imagine an ordinary newborn of their own gender and write down the ten most important events they thought would happen in the newborn’s life across the life span. Participants were also asked to report the expected age at the event (Berntsen & Rubin, 2004; Bohn & Berntsen, 2008, 2013).

Scorings

Single autobiographical event. The single autobiographical event stories (weekend stories) were coded for general narrative coherence using Bohn and Berntsen’s scale (2008) which is an adapted version of Peterson and McCabe’s (1983) scale for measuring single narratives’ coherence. Scorings were 0 = Disoriented pattern: the narrative is too confused or disoriented for the listener to understand; 1 = Chronological pattern: the narrative is a simple description of successive events (“and then, and then”); 2 = Chronological, interesting pattern: the narratives describes successive events in detail and interestingly (use of adjectives, adverbs, and subordinate clauses); 3 = Classic pattern: the narrative builds to a high point, evaluative dwells on it, then resolves it (Bohn & Berntsen, 2008). Length of weekend stories was measured by word count. Weekend stories were also coded for overall emotional tone on a 5-point Likert scale based on work by McAdams et al. (2006). Scorings were -1 = very negative, -2 = negative, 0= mixed (neutral), 1 = positive and 2 = very positive. Thirty percent of the
weekend stories were scored by two raters. Agreement rates were satisfactory with inter-class correlations for weekend story coherence of .73 and emotional tone of .77. Disagreements were resolved by discussion, and the remaining stories were scored by one rater.

**Past and Future Life Stories**

Emotional tone. Like the weekend stories, past and future life stories were coded for overall emotional tone on the same 5-point Likert scale based on work by McAdams et al. (2006). Independent coders read the entire life stories from beginning to end and coded the overall impression of the emotional tone of the entire life story. Two independent coders scored thirty percent of past and future life stories. Interrater agreement was satisfactory to high with an intra-class correlation of .82 for past and .80 for future. Disagreements were solved by discussion and the remaining stories were scored by one rater.

*Life Story Coherence.* Life story coherence in past and future life stories was measured by the scale developed by Bohn and Berntsen (2008). The scores were 0 = life story consist of a single episode; 1 = several episodes, loosely ordered chronologically; 2 = chronological order, episodes are tied together chronologically; 3 = evaluative narrative. Length of life stories was measured by word count.

*Cultural life scripts.* Bohn and Berntsen (2008) established an adult norm for measuring the acquisition of cultural life scripts in youth. A sample of adults filled in the ten most important events they thought would happen in an average newborn’s life of the same gender and estimated the age at the events. Events had to be mentioned by at least 4% of participants to fulfill the requirement for a life script category. This resulted in an adult life script norm of 41 event categories (Bohn & Berntsen, 2008). In the present study, participants’ life scripts were classified according to the 41 event categories in the established adult norm from 2008. Two raters scored forty percent of all cultural life scripts. There was high agreement between the two
raters, $\kappa = .903$, $p < .0005$. Disagreements were solved by discussion, and the remaining life scripts were scored by one rater.

To measure the normativity of the life script events mentioned by the adolescents, life scripts were scored using the *typicality score* (Bohn & Berntsen 2008; Rubin, Berntsen & Hutson, 2009). The typicality score is based on how often a life script event had been mentioned by an adult in Bohn and Berntsen (2008). For example, *begin school* was mentioned by 97 of the 111 adult participants in Bohn and Berntsen. Thus, the event has the typicality score of 97. The higher an event’s typicality score, the more people agree on this event as being part of the cultural life script and being more typical or normative for a life. Typicality scores for all ten events were added to make up the final typicality score. The higher the adolescents scored on the typicality score, the more normative or adult-like their life scripts were considered to be (Bohn & Berntsen, 2008, 2013).

*Cultural life script events and valence of life stories events.* The number of life scripts events mentioned in the past and future life stories was scored by counting events that corresponded to one of the 41 life script event categories in the adult norm defined in earlier research with adults (Bohn & Berntsen, 2008). All events, also non-life script events, were counted to calculate the total number of events included in the life stories. All life story events were rated on emotional valence (positive, negative and neutral). If an event that usually is perceived as positive, was described as negative (e.g. “I got a dog for my birthday, but from the start, the dog liked my brother more than me”), then the event was scored as negative, and vice versa. However, this pertained to only very few events. The percentages of all three kinds of emotional events in the life stories were calculated. Two raters scored all variables in thirty-seven percent of the past and future life stories. Rater agreement was high with intra-class correlations for past life stories between .86 and .95 and
for future between .91 and .97. Disagreements were resolved by discussion, and the remaining stories were scored by one rater.

Results

Seven participants had missing data, and two participants misunderstood the instructions for the cultural life script. This left 133 participants who had understood and filled in all four tasks. We first ran all analyses leaving out the nine participants with missing data. We then ran the analyses including the nine participants with missing data, leading to different ns in the analyses, because different participant had different missing data (e.g. past life story or future life story missing). The results including all participant yielded the same pattern as the ones only including participants without missing data, and we therefore present the analyses including all participants here. First, we will present the results concerning past and future life stories, then results on development of life stories and cultural life scripts. Finally, we present findings on single event stories and gender.

We conducted repeated-measures analyses of variance (ANOVAs) with time (past vs. future) as a within subject factor and class grade (4, 6-7, 8) as between subjects factors. We included gender as a between subject factor in the analyses on length and coherence because prior research in autobiographical memory development has found that girls generally tell longer and more coherent narratives than boys do (e.g., Bohanek & Fivush, 2010; Bohn & Berntsen, 2008). Table 1 shows means and standard deviations of story variables by class grade for past and future life stories. Table 2 shows the main effects and interactions for time directions and grade.

Past vs Future Life Stories

Emotional tone and valence of events. Results showed the expected effect of time with
future life stories being more positive in overall emotional tone than past life stories and containing a lower percentage of negative events than past life stories (see Tables 1 and 2). Table 3 shows the distribution of emotional tone across groups and time directions. For past life stories across groups, a large percentage of life stories are mixed, whereas for future life stories, the overwhelming majority of stories are positive in emotional tone. To examine if there was a relationship between positive and negative events mentioned in the life stories and the overall emotional tone of the life stories we conducted correlation analyses. For past life stories, a more positive overall emotional tone correlated strongly with higher percentages of positive events in the life story ($r(137) = .684, p < .001$) and a more negative overall emotional tone correlated strongly with higher percentages of negative events in the life story ($r(137) = -.697, p < .001$). Also in future life stories a more positive overall emotional tone correlated with higher percentages of positive events in the life story ($r(134) = .250, p = .003$) and a more negative overall emotional tone correlated with higher percentages of negative events in the life story ($r(134) = -.269, p = .002$), though these correlations were not as strong as the ones for past life stories. Emotional tone of past and future life stories correlated positively ($r(134) = .245, p = .004$), that is, adolescents who wrote a more positive past life story also wrote a more positive future life story and vice versa.

Length, coherence, and cultural life script events. As expected, there were main effects of time on length and coherence of life stories (see Table 2) with past life stories being longer and more coherent than future life stories across all age groups. Also consistent with our hypotheses, future life stories contained higher percentages of life script events in all age groups (see Table 1 and 2).

Development across Groups

Emotional tone and valence of events. There was no effect of age group on emotional
tone (Table 3). Regarding positive and negative events in life stories, there was a main effect of age group, with fourth graders including a higher percentage of positive events than sixth-seventh graders (p = .013) and eighth graders (p = .001), and eighth graders reporting a higher percentage of negative events than fourth graders (p=.01).

Length, coherence and cultural life script events. There was a 3 way interaction of time x grade x gender on length (F=8.39, \(\eta^2_p=.113, p<.0001\)). To untangle this finding, we conducted repeated measures ANOVAs separately for boys and girls. In both groups, there were significant interactions of grade and time (boys: \(F=7.05, \eta^2_p=.147, p=.002\); girls: \(F=14.06, \eta^2_p=.305, p<.0001\)). Tukey HDS post hoc tests showed a different pattern in boys and girls. In the boy group, fourth graders wrote significantly shorter past life stories than the two older groups, whereas eighth grade girls wrote significantly longer past life stories than the two younger groups. For future life stories, eighth grade boys wrote significantly longer stories than the two younger groups, whereas the development in the girl group was more linear with eighth graders writing significant longer stories than six/seventh graders, and six/seventh graders writing longer stories than fourth graders.

In relation to coherence of past and future life stories, there was a main effect of age group. Fourth graders wrote significantly less coherent life stories than the two older age groups (all \(ps<.001\), and sixth-seventh graders wrote life stories that were significantly less coherent than eight graders (\(p = .047\)). Analyses with coherence were also conducted using length in both past and future life stories together as covariates. With length of past and future life stories as controls in the model, there was still an age related difference in coherence of life stories in both past and future life story coherence, \((F(2, 132) = 16.51, p < .001, \eta^2_p = .20)\). No effect of age group on percentages of cultural life script events included in the life stories was found. In all age groups future life stories contained more life script events than past life.
stories. Tables 5 and 6 list the life script events mentioned in the adolescents’ past and future life stories by grade. Results are in line with previous studies finding that children and adolescents view their future to be positive and seem to see the future more idyllic and schematic than the past (Berntsen & Bohn, 2010; Berntsen & Jacobsen, 2008; D’Argembeau & Van der Linden, 2004).

To replicate earlier findings that life script typicality would predict life story coherence but not weekend story coherence, we conducted standard regression analyses with life story coherences and weekend story coherence as dependent variables, and age, gender and life script typicality as predictors (Table 4). Age and gender consistently predicted all story coherences. Weekend story coherence was not predicted by life script typicality, whereas both past and future life story coherences were predicted by life script typicality.

Cultural Life Script Typicality. An ANOVA with class grade as between-subjects factors and life script typicality as dependent variable showed main effects for grade, \(F(2) = 3.23, p = .05, \eta^2_p = .05\) and gender \(F(1) = 3.97, p < .05, \eta^2_p = .03\). Girls had more typical life scripts than boys \((M = 299.57, SD = 142.93 \text{ vs. } M = 255.64, SD = 122.85)\). Post hoc comparisons showed that fourth graders’ life scripts were significantly less typical than eighth graders \((p = .014)\)

Means and SDs for Grades, 4, 6-7, 8, respectively: \(M = 238.15, SD = 123.04; M = 290.75, SD = 121.92; M = 303.67, SD = 145.02\). Consistent with these findings, age correlated positively with the life script typicality score \((r(153) = .237, p = .003)\).

Single Event Stories (Weekend Stories). A series of ANOVAs showed age-related differences in length and coherence of single event stories, with length \(F(3,157) = 13.30, p < .001, \eta^2_p = .20\) and coherence \(F(3,157) = 17.59, p < .001, \eta^2_p = .25\) increasing across age groups (see Table 7 for means and standard deviations of weekend story variables by age group). Post hoc comparisons (Bonferroni adjusted) showed that only the eighth graders wrote weekend stories that
were longer than the other age groups’ (all ps < .034), whereas there were no differences in weekend story length between fourth and sixth-seventh graders (p = 1.00).

Regarding coherence, the two youngest groups wrote single event stories that were significantly less coherent than the eighth’ graders stories (ps < .001). No other comparisons were significant,i.e. there were no group differences in relation to emotional tone.

**Discussion**

In the present study, we found that across age groups, participants told past life stories that were mixed or moderately positive in emotional tone and future life stories that were positive or extremely positive. The results suggest that adolescents tell life stories that support a positive self-image. There were important developmental differences across the age groups, confirming our hypothesis that overall life story coherence develops across adolescence.

**Emotional Tone in Life Stories**

When reading or listening to a life story, the audience gets a sense of the emotional feel of the life story beyond the events mentioned. In all three groups of adolescents, in the majority of past life stories, the emotional tone was mixed whereas future life stories were positive or extremely positive (see Table 3). Interestingly, there were no differences across age groups in overall emotional tone. Our findings support the idea that also in relation to life stories in adolescence, the future is biased by uncorrected positive illusions, whereas past life stories are constrained by the reality of events that have actually happened - like parents getting divorced (Rasmussen & Berntsen, 2013). This was supported by the strong correlations of emotional tone and past life story valences. In our sample, the overall emotional tone in life stories therefore seems to indicate that across adolescence, young people develop the ability to use life stories for positive purposes. The life stories represent a positive view of one’s personal story but maybe even more importantly, adolescents seem to be biased towards imagining a highly positive and
idyllic personal life story of the future. Rasmussen and Berntsen (2013) found that imagining the future plays a central role for maintaining a positive self-image, and more so than remembering the past.

Other research has shown that having a positive outlook of the future is adaptive; that is to say, it is associated with psychological and physical health (e.g., Taylor & Brown, 1988), motivational processes that play a role in action planning, goal pursuit, and problem solving (e.g., D’Argembeau & Mathy, 2011), and self-enhancement (e.g., Grysman, et al., 2013). Bohn and Berntsen (2013) investigated valence of life stories by looking at the percentages of positive and negative events in the life stories and concluded that adolescents told very positive future life stories and that the future was more positive than the past. It seems logical to assume that the number of positive and negative events in life stories is related to the emotional tone of the life stories. Supporting this notion, adolescents mentioning a higher percentage of positive events in their life stories had life stories that were more positive in emotional tone, and life stories with a higher percentage of negative events were more negative in emotional tone. Results indicate that differences in emotional tone partially reflect variations in actual life experiences. However, there may be individual differences in the way people narrate their past and future life stories in relation to overall emotional tone, indicative of a more general tendency to tell positive or negative life stories (McAdams, 2004). We found some support for this hypothesis, as adolescents who told past life stories with a more positive emotional tone also tended to view their future more positively than adolescents with a more negative past life story. In the current study, we cannot say if this is due to interpretation of events, the actual events experienced, personality traits or well-being. Adolescents who have experienced life as pleasant with having friends and easily achieved goals might simply have a basis for anticipating positive things in their future and a more positive self-image. Future studies will
have to entangle these factors.

**Development of Life Story Coherence**

We replicated findings on age-related differences in life story coherence in both past (Bohn & Berntsen, 2008; Köber et al. 2015; Habermas & Paha, 2001; Habermas & de Silveira, 2008) and future life stories (Bohn & Berntsen, 2013). Younger participants wrote life stories that were shorter and less coherent than the older groups’ in both past and future. The increase in life story coherence across adolescence provides further evidence that the emergence of coherent life stories takes place during adolescence, which marks a qualitatively change in life story development and the self (Habermas & Reese, 2015).

In the present study, cultural life script typicality predicted life story coherence in both past and future life stories, but not single weekend stories. Earlier findings have shown mixed results, with one study (Bohn & Berntsen, 2008) finding that cultural life script typicality predicted life story coherence in past life stories, whereas a more recent study found that cultural life script typicality did not predict life story coherence for past, but only for future life stories (Bohn & Berntsen, 2013). In the current study, results support the hypothesis that cultural knowledge is important for life story coherence of both past and future life stories. Importantly, and consistent with the hypothesis that cultural coherence is specific to life stories (Habermas & Bluck, 2000), neither in the current nor the earlier studies did cultural life script typicality predict single event story coherence (Bohn & Berntsen, 2008, 2013).

Future life stories consisted mainly of cultural life script events expected to occur in young adulthood, such as education, career, getting married and having children (see Table 6). These findings are in line with having a more positive outlook on the future, since cultural life scripts are dominated by positive events that are expected to happen in adolescence and early adulthood (Berntsen & Rubin, 2004; Bohn & Berntsen, 2014). The results support the hypothesis
that when imagining the future, people rely more on script-like and semantic knowledge than when remembering the past (e.g., Berntsen & Bohn, 2010; D’Argembeau & Van der Linden, 2004; Grysman et al., 2013). The inclusion of cultural life script events indicates that adolescents rely on cultural knowledge to select and organize their personal past and future life stories, supporting the notion that cultural knowledge is important for the formation of coherent life stories. Overall, adolescents seem to see a normative life as a good and desirable life that they wish to settle into or achieve.

**Conclusion**

This study is the first to investigate the development of emotional tone in past and future life stories across age groups in adolescence. Adolescents wrote past life stories that were mixed or moderately positive in emotional tone and future life stories that were highly positive. The emotional tone of life stories did not differ across age groups, indicating that youths aged 10 to 14 tell life stories that are similar in emotionality. The results support the idea that adolescents tell positive life stories that maintain a positive self-image especially in relation to their futures. We propose that the development of overall emotional tone in life stories could be relevant to examine in more diverse populations of adolescents to untangle the relation between experienced life events and emotional tone, and to investigate whether the developmental pattern of emotional tone in life stories is the same, independent of for example socio-economic or cultural background.
References


Habermas, T., & Reese, E. (2015). Getting a life takes time: The development of the life story in

doi: http://dx.doi.org/10.1159/2F000437245


doi: https://doi.org/10.1080/0163853X.2015.1105619


doi: https://doi.org/10.1177/0146167201274008


Table 1

*Means and Standard Deviations for Life Story Variables by Grade and Time*

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Fourth grade</th>
<th></th>
<th>Sixth-Seventh grade</th>
<th></th>
<th>Eighth grade</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past</td>
<td>Future</td>
<td>Past</td>
<td>Future</td>
<td>Past</td>
<td>Future</td>
</tr>
<tr>
<td>Life story length</td>
<td>104.2</td>
<td>62.5</td>
<td>31.1</td>
<td>23.6</td>
<td>232.2</td>
<td>131.4</td>
</tr>
<tr>
<td>Coherence</td>
<td>1.6</td>
<td>0.9</td>
<td>0.9</td>
<td>0.7</td>
<td>2.4</td>
<td>0.7</td>
</tr>
<tr>
<td>% Life Script</td>
<td>22.9</td>
<td>22.9</td>
<td>58.2</td>
<td>30.9</td>
<td>20.9</td>
<td>15.1</td>
</tr>
<tr>
<td>% positive events</td>
<td>63.0</td>
<td>28.7</td>
<td>96.2</td>
<td>10.8</td>
<td>51.7</td>
<td>22.6</td>
</tr>
<tr>
<td>% negative events</td>
<td>22.1</td>
<td>22.2</td>
<td>1.9</td>
<td>9.6</td>
<td>26.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Emotional tone</td>
<td>0.3</td>
<td>0.8</td>
<td>1.2</td>
<td>0.6</td>
<td>0.1</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Note.* Life story length = number of words, % Life Script = percentage of life script events in stories, % positive events = percentage of positive events in life stories, % negative events = percentage of negative events in stories. Emotional tone = overall emotional tone of life stories.
Table 2

*Mean Effects and Interactions for Life Story Variables*

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Time (Future vs. Past)</th>
<th>Grade (4, 6-7, 8)</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main effects</td>
<td>Interaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( F )</td>
<td>( \eta^2_p )</td>
<td>( F )</td>
</tr>
<tr>
<td>Life story length</td>
<td>152.66***</td>
<td>.54</td>
<td>53.71***</td>
</tr>
<tr>
<td>Coherence</td>
<td>65.34***</td>
<td>.34</td>
<td>65.34***</td>
</tr>
<tr>
<td>% Life Script</td>
<td>242.18***</td>
<td>.65</td>
<td>1.41</td>
</tr>
<tr>
<td>% Positive events</td>
<td>242.57***</td>
<td>.65</td>
<td>7.64**</td>
</tr>
<tr>
<td>% Negative events</td>
<td>140.60***</td>
<td>.52</td>
<td>3.62*</td>
</tr>
<tr>
<td>Emotional tone</td>
<td>203.36***</td>
<td>.61</td>
<td>0.94</td>
</tr>
</tbody>
</table>

*Note.* Life story length = number of words, % Life Script = percentage of life script events in stories, % positive events = percentage of positive events in life stories, % negative events = percentage of negative events in stories, Emotional tone = overall emotional tone of life stories. * \( p < .05 \); ** \( p < .01 \); *** \( p < .001 \)
Table 3

*Scores of Overall Emotional Tone in Past and Future [ratings from -2 to 2] by Class Grade (in Percentages)*

<table>
<thead>
<tr>
<th>Emotional tone</th>
<th>Fourth grade</th>
<th></th>
<th>Sixth-Seventh grade</th>
<th></th>
<th>Eight grade</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past (n = 50)</td>
<td>Future (n = 49)</td>
<td>Past (n = 35)</td>
<td>Future (n = 34)</td>
<td>Past (n = 54)</td>
<td>Future (n = 55)</td>
</tr>
<tr>
<td>Very negative (-2)</td>
<td>2.0</td>
<td>0.0</td>
<td>5.9</td>
<td>0.0</td>
<td>3.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Negative (-1)</td>
<td>12.0</td>
<td>0.0</td>
<td>8.8</td>
<td>0.0</td>
<td>11.1</td>
<td>0.0</td>
</tr>
<tr>
<td>Mixed/ neutral (0)</td>
<td>44.0</td>
<td>10.2</td>
<td>50.0</td>
<td>2.9</td>
<td>59.3</td>
<td>5.5</td>
</tr>
<tr>
<td>Positive (1)</td>
<td>36.0</td>
<td>63.3</td>
<td>35.5</td>
<td>55.9</td>
<td>22.2</td>
<td>54.5</td>
</tr>
<tr>
<td>Very positive (2)</td>
<td>6.0</td>
<td>26.5</td>
<td>0.0</td>
<td>41.2</td>
<td>3.7</td>
<td>40.0</td>
</tr>
</tbody>
</table>
Table 4

*Standard Regression Analyses with Age, Gender, and Life Script Typicality as Predictors and Story Coherence Measures as Dependent Variables*

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Predictors</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Gender</td>
<td>Typicality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekend story coherence</td>
<td>.410***</td>
<td>.085, .182</td>
<td>- .250**</td>
<td>-.485, -.122</td>
<td>.118</td>
<td>.000, .001</td>
<td>.278</td>
</tr>
<tr>
<td>Past life story coherence</td>
<td>.535***</td>
<td>.180, .297</td>
<td>- .243**</td>
<td>-.623, -.189</td>
<td>.226**</td>
<td>.001, .002</td>
<td>.458</td>
</tr>
<tr>
<td>Future life story coherence</td>
<td>.508***</td>
<td>.189, .320</td>
<td>- .334***</td>
<td>-.865, -.381</td>
<td>.183**</td>
<td>.000, .002</td>
<td>.465</td>
</tr>
</tbody>
</table>

*Note. Typicality = life script typicality. * *p < .05, ** p < .01, *** p < .001*
Table 5

*Life Script Events in Past Life Stories (in Percentages; Rank Ordered by Eight Grade Frequencies)*

<table>
<thead>
<tr>
<th>Life script event</th>
<th>Fourth $(n = 50)$</th>
<th>Sixth-seventh $(n = 35)$</th>
<th>Eight $(n = 57)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own birth</td>
<td>24.0</td>
<td>60.0</td>
<td>56.1</td>
</tr>
<tr>
<td>Siblings</td>
<td>24.0</td>
<td>22.9</td>
<td>43.9</td>
</tr>
<tr>
<td>Hobbies/sports</td>
<td>24.0</td>
<td>51.4</td>
<td>42.1</td>
</tr>
<tr>
<td>Confirmation</td>
<td>-</td>
<td>2.9</td>
<td>36.8</td>
</tr>
<tr>
<td>Begin day care (3+)</td>
<td>12.0</td>
<td>42.9</td>
<td>35.1</td>
</tr>
<tr>
<td>Begin school</td>
<td>10.0</td>
<td>40.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Other’s death</td>
<td>16.0</td>
<td>14.3</td>
<td>28.1</td>
</tr>
<tr>
<td>Parents’ divorce</td>
<td>20.0</td>
<td>20.0</td>
<td>26.3</td>
</tr>
<tr>
<td>Begin day care (½ +)</td>
<td>2.0</td>
<td>14.3</td>
<td>15.8</td>
</tr>
<tr>
<td>Get a job</td>
<td>-</td>
<td>2.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Serious disease</td>
<td>4.0</td>
<td>5.7</td>
<td>7.0</td>
</tr>
<tr>
<td>Fall in love</td>
<td>-</td>
<td>5.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Boarding school</td>
<td>-</td>
<td>-</td>
<td>3.5</td>
</tr>
<tr>
<td>Parent’s death</td>
<td>-</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>Begin to walk</td>
<td>2.0</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>First friend</td>
<td>-</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Puberty</td>
<td>-</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>Long trip</td>
<td>4.0</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Begin to talk</td>
<td>-</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>Special birthdays</td>
<td>10.0</td>
<td>2.9</td>
<td>-</td>
</tr>
<tr>
<td>First job</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Dashes indicate that events were not mentioned at all in the group.
Table 6

*Life Script Events in Future Life Stories (in Percentages; Rank Ordered by Eight Grade Frequencies)*

<table>
<thead>
<tr>
<th>Life script event</th>
<th>Fourth ((n = 50))</th>
<th>Sixth-seventh ((n = 35))</th>
<th>Eight ((n = 57))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Career</td>
<td>66.0</td>
<td>65.7</td>
<td>73.7</td>
</tr>
<tr>
<td>Children</td>
<td>18.0</td>
<td>40.0</td>
<td>61.4</td>
</tr>
<tr>
<td>College</td>
<td>10.0</td>
<td>45.7</td>
<td>59.6</td>
</tr>
<tr>
<td>Go to high school</td>
<td>6.0</td>
<td>22.9</td>
<td>47.4</td>
</tr>
<tr>
<td>Serious relationship</td>
<td>6.0</td>
<td>5.7</td>
<td>35.1</td>
</tr>
<tr>
<td>Marriage</td>
<td>8.0</td>
<td>22.9</td>
<td>31.6</td>
</tr>
<tr>
<td>Own death</td>
<td>4.0</td>
<td>17.1</td>
<td>26.3</td>
</tr>
<tr>
<td>Get a job</td>
<td>4.0</td>
<td>2.9</td>
<td>17.5</td>
</tr>
<tr>
<td>Continuation school</td>
<td>6.0</td>
<td>22.9</td>
<td>17.5</td>
</tr>
<tr>
<td>Own house</td>
<td>8.0</td>
<td>11.4</td>
<td>15.8</td>
</tr>
<tr>
<td>Grandchildren</td>
<td>2.0</td>
<td>5.7</td>
<td>12.3</td>
</tr>
<tr>
<td>Finish ninth grade</td>
<td>4.0</td>
<td>-</td>
<td>12.3</td>
</tr>
<tr>
<td>Hobbies/sports</td>
<td>8.0</td>
<td>22.9</td>
<td>10.5</td>
</tr>
<tr>
<td>Retirement</td>
<td>2.0</td>
<td>14.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Finish high school</td>
<td>-</td>
<td>2.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Leave home</td>
<td>-</td>
<td>2.9</td>
<td>5.3</td>
</tr>
<tr>
<td>Long trip</td>
<td>-</td>
<td>5.7</td>
<td>5.3</td>
</tr>
<tr>
<td>First job</td>
<td>-</td>
<td>-</td>
<td>3.5</td>
</tr>
<tr>
<td>Live in retirement home</td>
<td>2.0</td>
<td>2.9</td>
<td>3.5</td>
</tr>
<tr>
<td>Fall in love</td>
<td>2.0</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Special birthdays</td>
<td>-</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td>Second/last child</td>
<td>2.0</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Confirmation</td>
<td>6.0</td>
<td>25.7</td>
<td>-</td>
</tr>
<tr>
<td>Other’s death</td>
<td>-</td>
<td>2.9</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Dashes indicate that events were not mentioned at all in the group.
Table 7

**Means (and Standard Deviations) for Weekend Coherence, Length and Emotional Tone by Grade**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Fourth grade M (SD)</th>
<th>Sixth-Seventh grade M (SD)</th>
<th>Eight grade M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekend Length</td>
<td>53.04 (35.48)</td>
<td>58.00 (44.62)</td>
<td>138.96 (117.31)</td>
</tr>
<tr>
<td>Weekend Coherence</td>
<td>1.18 (.39)</td>
<td>1.29 (.46)</td>
<td>1.86 (.67)</td>
</tr>
<tr>
<td>Weekend Emotional tone</td>
<td>0.96 (.49)</td>
<td>0.83 (.82)</td>
<td>0.91 (.85)</td>
</tr>
</tbody>
</table>