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Narrative Coherence in Adolescence: Relations With Attachment, Mentalization, and Psychopathology

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ABSTRACT

Narrative coherence refers to the overall completeness of the narrative that helps the individual to draw meaning from past events. Research has predominantly focused on developmental trajectories of narrative coherence among typically developing individuals and less research sheds light on narrative coherence in adolescents facing serious psychological difficulties. This study is the first to apply Baerger and McAdams's well-validated coding scheme of narrative coherence to adolescents and to rate narrative coherence based on the content derived from the Child Attachment Interview in the context of attachment security, mentalization, and internalizing and externalizing pathology in 70 inpatient adolescents. Findings emphasized that the coding scheme is applicable for adolescents and attachment narratives. Narrative coherence was negatively correlated with age and no gender differences were found. Higher attachment security and better mentalization both contributed to more coherent narratives. More coherent narratives predicted less externalizing problems, but when controlling for mentalization and attachment security, mentalization was the strongest predictor. The relation between narrative coherence and other social-cognitive constructs is discussed, as well as how poor narrative coherence should be taken into account with respect to psychopathology in adolescence. Finally, the value of this coding scheme to evaluating narrative coherence in adolescence is discussed.

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Personal narratives help the individual to make sense of past events (Bruner, 1990); the narrative that individuals construct about events contributes to the ability to draw meaning from them, which is greatly facilitated when narratives are more coherent (Linde, 1993). Researchers in cognitive developmental psychology emphasize that narrative coherence constitutes an important aspect of a high-quality narrative and encompasses the overall structure, flow, and meaning of the narrative (e.g., Baerger & McAdams, 1999; Mandler, 1978; Peterson & McCabe, 1983; Reese et al., 2011). That is, narrative coherence contributes to locating a specific narrative in time and place and incorporates intentions, motivations, thoughts, and feelings within the narrative (Linde, 1993; Reese et al., 2011).

Some research indicates that narrative coherence evolves as other aspects of social cognition become more sophisticated (e.g., theory of mind and mentalization; Bateman & Fonagy, 2016; Nelson & Fivush, 2004; Welch-Ross, 2001), and Reese (2002) emphasized that the ability to understand mental states in oneself and others might be a prerequisite for developing coherent narratives about personal past events. The majority of research linking narrative coherence to social cognition is based on children (Nelson & Fivush, 2004), but a recent study showed that mentalization, or the ability to infer mental states (e.g., thoughts, feelings,

intentions) in oneself and in others improved throughout adolescence and was a significant predictor of more coherent life narratives in adulthood (Köber, Kuhn, Peters, & Habermas, 2018). However, research is needed that examines whether this also applies to coherence of single-event narratives, which seem to constitute a different developmental pathway than life narratives (Bohn & Berntsen, 2008). In fact, Bohn and Berntsen (2008) showed that the partial correlation between coherence of life stories and single events was no longer statistically significant once age was partialled out, $r(103) = .18, p > .05$.

Life narratives emerge gradually and become more detailed, coherent, emotionally rich, and meaningfully connected throughout adolescence and early adulthood (e.g., Habermas & Bluck, 2000; McLean & Pratt, 2006), whereas the construction of coherent single-event narratives (e.g., what happened last Christmas) is basically accomplished by late childhood (e.g., Fivush, Haden, & Adam, 1995; Nelson & Fivush, 2004; Reese, 2014) and increases only moderately thereafter (e.g., Bohn & Berntsen, 2008). For example, around the age of 10 to 12, children orient the listener to the time and place of specific past events (e.g., O'Kearney, Speyer, & Kenardy, 2007) and Peterson and McCabe (1983) showed that the majority of children in late childhood constructed highly coherent and goal-directed narratives. Reese

and colleagues (2011) showed that school-aged children continued to tailor more chronologically, context-oriented, and thematically coherent narratives into adolescence. In early adolescence, the more sophisticated metacognitive abilities necessary for drawing meaning from and reflecting on the event in relation to the self develop (Habermas & Bluck, 2000; Reese et al., 2011). When adolescents' and adults' abilities to construct coherent narratives of single events are compared, more similarities than differences appear (Bauer, Hättenschwiler, & Larkina, 2016). In other words, research mapping developmental trajectories of coherence of single-event narratives is well established and suggests that there is not much development beyond adolescence in terms of narrative coherence.

Despite the strong focus of research on these trajectories, the focus has mainly been on typically developing personality, with less research shedding light on individuals struggling with serious personal and psychological difficulties. There is compelling evidence that adolescence is a key period for the emergence of psychopathology, with many psychiatric disorders emerging during this period (e.g., Hankin, 2006; Kessler et al., 2005; Paus, Keshavan, & Giedd, 2008). Relative to other periods of the life span, susceptibility to a number of psychiatric disorders is greatest during adolescence (e.g., Merikangas et al., 2010) and appear more enduring than those appearing later in life (e.g., Fairchild, 2011). Thus, identifying developmental factors such as poor narrative coherence that might associate with adolescent psychopathology is crucial to prevent entrenchment of psychopathology over time.

This study

In this study, we use an existing, well-validated coding scheme for narrative coherence (Baerger & McAdams, 1999) to rate personal narratives derived from the Child Attachment Interview (CAI; Target, Fonagy, Schmueli-goetz, Data, & Schneider, 2007). Baerger and McAdams (1999) defined narrative coherence as a multidimensional structural characteristic of stories that captures their overall organization as well as more emotional and reflective aspects such as linking pieces of stories that represent who one is as a person. Baerger and McAdams's (1999) measure has traditionally been used to examine individual differences in adults, whereas a different measure (Reese et al., 2011) has been used for developmental studies. An aim of this study was, however, to show that Baerger and McAdams's (1999) coding scheme is also applicable for adolescents. Another rationale for choosing this coding scheme for use in an inpatient sample of adolescents is its prior use in adult patient samples (e.g., Achenbach & Rescorla, 2001; Adler, Lodi-Smith, Philippe, & Houle, 2016). Moreover, narrative coherence has typically been rated from the well-established Life Story Interview (LSI; McAdams, 2008), although its application to the CAI has not been explored (Crowell, Treboux, Brockmeyer, 2009). However, the two interviews share important, fundamental aspects in their prompts, which should make this possible: In both interviews, the

person is asked to recall personal, past events and encouraged to provide detailed and elaborative descriptions of the events. Thus, both interviews elicit detailed descriptions about discrete personal past events, which can be evaluated in terms of narrative coherence. In addition, the CAI interview is a modification of the Adult Attachment Interview (AAI), which takes the developmental stage of the subject into account (e.g., cognitive development), making the CAI more suitable for rating narrative coherence in adolescents. The integration of different measures is in line with a recent article written by prominent researchers in the narrative field highlighting and embracing the broad applicability of narrative rating schemes (Adler, Chin, Aiswarya, Kolisetty, & Oltmanns, 2012). Finally, it should be noted that Baerger and McAdams's (1999) coding system has been applied to single personal narratives in the past whereas the CAI incorporates several narratives exemplifying characteristics of significant persons (i.e., mother, father, and self). Although this should be acknowledged as an important difference, recent research shows significant relations between how individuals elaborate on their personal narratives and on narratives of their parents indicating an overall narrative style ($r_s = .24-.37$, $p_s < .01$; Lind & Thomsen, 2017).

This study has three additional aims. First, we aimed to examine descriptive aspects of narrative coherence such as its relation to age and gender given the extension of this coding scheme to a novel sample of inpatient adolescents. Because narrative coherence is undergoing development during early childhood (Reese, 2014) and increases only moderately after late childhood (e.g., Bohn & Berntsen, 2008), we expected adolescents to demonstrate coherence in their narratives but expected age to correlate positively with coherence. In terms of gender differences, findings are inconsistent in the autobiographical memory literature (see Grysman & Hudson, 2013, for a review). For example, previous studies have shown that girls tend to tell longer, more elaborated, and more emotionally expressive narratives (e.g., Bauer, Stennes, & Haight, 2003; Fivush, Bohanek, Zaman, & Grapin, 2012; Thorne & Mclean, 2002); however, research has also shown gender similarities in thematic coherence (Grysman, Fivush, Merrill, & Graci, 2016). In this study, we therefore had no priori hypotheses regarding gender differences in narrative coherence.

Second, we aimed to examine relations between narrative coherence and two related but distinct social-cognitive capacities—attachment and mentalization. Attachment was measured using an indicator of attachment coherence derived from the CAI. Attachment coherence scores have been shown to provide an overall dimensional index of secure attachment (Sharp, Sharp, & Tackett, 2014; van Vreeswijk & de Wilde, 2014), with higher coherence scores reflective of higher attachment security. Although both measures share their focus on coherence, they do so in different ways: Attachment coherence is born out of clinical psychology from assessments of individual differences in attachment status and encompasses how consistent and uncontradictory narratives are, typically as rated from video recordings of the CAI (Crowell et al., 2009). Exemplifying

an inconsistent narrative (i.e., low attachment coherence) would be an adolescent describing his mother as kind, but later emphasizing how he would never want to become like his mother because he sees himself as a kind person. In contrast, the narrative coherence measure originates from autobiographical memory research and is concerned with the flow and meaning of the narrative and how complete its architecture is (Baerger & McAdams, 1999). Previous studies have shown that mothers of securely attached infants are more likely to produce coherent and elaborative narratives about the personal past (Etzion-Carasso & Oppenheim, 2000; Gini, Oppenheim, & Sagi-Schwartz, 2007). In addition, a great body of research evidence supports the notion that both mothers' and children's attachment styles are related to their dyadic construction of narratives about the child's personal experiences, which seems to scaffold children's (Zaman & Fivush, 2013) and later on adolescents' (Fivush, Habermas, Waters, & Zaman, 2011; Lind & Thomsen, 2017) remembering and interpretation of events. Thus, we expected that attachment coherence (or security; van Vreeswijk & de Wilde, 2014) would correlate with narrative coherence of past events, still demonstrating uniqueness as constructs. Because some studies emphasize that coherence is largely affected by the length of the narratives in pre-school children ($r_s = .36-.79$, $p < .05$; Reese et al., 2011), although the correlation partly disappears or becomes more unsystematic in school-aged children and adults ($r_s = .34-.62$, $p < .05$; Reese et al., 2011), we controlled for narrative length in both coherence measures.

Furthermore, we expected that better mentalization skills, operationalized as reflective functioning (i.e., the capacity to understand ourselves and others in terms of intentional mental states, such as feelings, desires, wishes, attitudes, and goals; Bateman & Fonagy, 2016; Shmueli-Goetz, Target, Fonagy, & Datta, 2008), would contribute to higher narrative coherence. Mentalization researchers emphasize that the ability to mentalize is important for self-understanding and self-organization (Bateman & Fonagy, 2016; Choi-Kain & Gunderson, 2008). This might also extend to the organization of personal past events because the individual must be able to mentalize one's own and others' feelings, intentions, and thoughts while also taking the listener's perspective into account to construct the narrative in a meaningful, coherent way (Köber et al., 2018). One previous study has shown that better mentalization was a significant predictor of more coherent life narratives ($\beta = .40$, $p < .05$; Köber et al., 2018); this might also be the case for narrative coherence of specific events. Because both attachment and mentalization have been emphasized as important contributors to constructing coherent narratives, we hypothesized that attachment coherence and mentalization would independently predict greater narrative coherence when controlling for each other.

Third, extant research has found and replicated relations between more coherent narratives and higher well-being (e.g., lower levels of depression, higher self-esteem and life satisfaction) (Adler et al., 2016; Baerger & McAdams, 1999). However, this relation is most robust in adulthood, whereas

studies conducted with adolescents and younger children are remarkably fewer in number and evidence more mixed results. For example, Fivush and Sales (2006) showed that children of mothers who helped them develop a complete narrative of a stressful event did not cope better than children whose mothers scaffolded a less complete narrative of the event, whereas another study showed that young adults with more coherent narratives for self-defining past events reported higher well-being (Waters & Fivush, 2015). Therefore, this study also explored whether more coherent narratives would contribute to fewer externalizing and internalizing problems in adolescents. Furthermore, because extant research indicates that lower mentalization (e.g., Gambin & Sharp, 2016; Lovett & Sheffield, 2007) and attachment insecurity (e.g., Madigan, Brumariu, Villani, Atkinson, & Lyons-Ruth, 2016) underlie externalizing and internalizing, we examined whether narrative coherence remained a significant predictor of externalizing problems when controlling for mentalization and attachment coherence.

Methods

Participants

U.S. adolescents were recruited from the adolescent unit of an inpatient psychiatric hospital, which serves individuals with severe behavioral and emotional disorders who have not responded to previous interventions. Inclusion criterion for the larger study was sufficient proficiency in English to consent to research and complete the necessary assessments, and exclusion criteria included a diagnosis of schizophrenia or other psychotic disorder, an autism spectrum disorder, or IQ less than 70. The full sample from this larger study included $N = 652$ adolescents (see Shmueli-Goetz et al., 20098, for a description); however, a consecutively admitted subgroup ($n = 70$) of adolescents participating in a larger study at this hospital was selected for this study based on their completion of certain measures, thereby excluding 582 individuals. Specifically, this subset of adolescents were chosen to have their CAI transcripts rated using the procedure for coding narrative identity (see later for a description). Although there were more females in the included group (80% females compared to 60% females in the excluded group), $\chi^2(1, N = 160) = 7.33$, $p < .01$, $d = 0.447$, there were no statistically significant differences between the subsample included and those excluded in terms of age, reflective function, internalizing, externalizing, or attachment coherence: age, $t(158) = -0.67$, $p = .50$, $d = 0.108$; reflective function, $t(117) = -0.89$, $p = .37$, $d = 0.151$; internalizing symptoms, $t(138) = 1.29$, $p = .20$, $d = 0.217$; externalizing symptoms, $t(138) = -0.34$, $p = .89$, $d = 0.023$; attachment coherence: $t(68) = -1.66$, $p = .10$, $d = 0.445$. The final sample ranged in age from 12 to 17 years ($M = 15.37$, $SD = 1.37$; females = 80%) and consisted of the following racial and ethnic backgrounds: 80% White, 7% Hispanic, 5% Asian, 2% African American, and 7% mixed or other. Length of stay for this subgroup ranged from 4 to 68 days ($M = 36.76$, $SD = 12.07$). Based on *Diagnostic and Statistical Manual of*

Table 1. Prevalence of diagnostic categories.

	<i>n</i>	%
No diagnosis	6	9.5
Single diagnostic class	14	22.2
Depression only	6	9.5
Anxiety only	5	7.9
Externalizing only	1	1.6
Substance use only	2	3.2
Two diagnostic classes	18	28.6
Depression and anxiety	9	14.3
Depression and bipolar	1	1.6
Depression and externalizing	2	3.2
Depression and substance	1	1.6
Anxiety and externalizing	3	4.8
Externalizing and substance	2	3.2
Three diagnostic classes	18	28.6
Depression, anxiety, eating	4	6.3
Depression, anxiety, externalizing	5	7.9
Depression, anxiety, substance	6	9.5
Depression, externalizing, substance	1	1.6
Anxiety, eating, externalizing	1	1.6
Anxiety, externalizing, substance	1	1.6
Four diagnostic classes	4	6.3
Depression, anxiety, bipolar, externalizing	1	1.6
Depression, anxiety, eating, externalizing	1	1.6
Depression, anxiety, externalizing, substance	2	3.2
Five diagnostic classes	3	4.8
Depression, anxiety, bipolar, externalizing, substance	2	3.2
Depression, anxiety, eating, externalizing, substance	1	1.6

Note. $n=63$. *DSM-IV* diagnoses were based on youth responses on the Computerized Diagnostic Schedule for Children. Depression included a positive diagnosis for either major depressive disorder or dysthymia; anxiety included a positive diagnosis for posttraumatic stress disorder, generalized anxiety disorder, separation anxiety disorder, specific phobia, social phobia, obsessive-compulsive disorder, panic disorder, or agoraphobia; externalizing included a positive diagnosis for attention-deficit disorder with hyperactivity, oppositional disorder, or conduct disorder; bipolar included a positive diagnosis for hypomania or mania; eating included a positive diagnosis for anorexia or bulimia; and substance included a positive diagnosis for alcohol abuse or dependence, marijuana abuse or dependence, nicotine dependence, other substance abuse or dependence. Seven participants (10%) in this study did not complete the diagnostic interview and therefore were not included in this descriptive analysis.

Mental Disorders (4th ed. [*DSM-IV*]; American Psychiatric Association, 1994) criteria, at admission 66.7% met criteria for a depressive disorder, 6.3% for a bipolar disorder, 11.1% for any eating disorder, 36.5% for an externalizing disorder, 28.6% for a substance use disorder, and 65.1% for any anxiety disorder. Given the high rates of comorbidity in the sample, Table 1 includes more detailed information about prevalence of *DSM-IV* psychiatric disorders.

Assessment

The Child Attachment Interview

The CAI (Crowell et al., 2009) is an interview-based measure that assesses youths' mental representations of their attachment figures. It has demonstrated adequate reliability and validity among children (Shmueli-Goetz et al., 2008) and adolescents (Venta, Shmueli-Goetz, & Sharp, 2014). The interview focuses on primary attachment figures, typically mother and father. The interview asks youth to describe each attachment figure in three words. Participants are then asked to provide an example of a specific event, and affective response, for each word. The interview also prompts for examples and affective response for times when each

attachment figure was angry at the teen, as well as times when the teen needed help, was sick or injured, experienced a loss, or spent time away from his or her parents. Interviews were conducted in private and recorded, then transcribed and each coded by a rater.

Narrative coherence

Narrative coherence was rated based on the content derived from the CAI (Crowell et al., 2009). To examine narrative coherence, a coding scheme was employed (Baerger & McAdams, 1999) that has been used in simplified versions in clinical adult samples (e.g., Achenbach & Rescorla, 2012; Adler et al., 2008). The coding scheme examines four dimensions of narrative coherence. *Orientation* assesses the degree to which the narrative provides the reader with sufficient background information to understand the context of the story. *Structure* assesses the extent to which the narrative flows logically from one point to the next. *Affect* assesses the extent to which the narrative uses emotion language to make an evaluative point. *Integration* assesses the extent to which the narrator relates the episode being described to whom he or she is as a person or expresses why this story has been told. In this study, each of the four dimensions is rated independently using a 0 to 3 scale, where 3 represents higher degrees of coherence (see Adler, Skalina, & McAdams, 2008, for examples of each of the four dimensions). Three coders independently rated 15% of the interviews with respect to narrative coherence to compute two-way random intraclass correlations (ICCs) as estimates of interrater reliability. Because the CAI contains three sections—a section in which the child elaborates on himself or herself, a section where the child focuses on his or her mother, and a section in which the child elaborates on his or her father—narrative coherence was rated separately for the child, the mother, and the father in terms of structure (child ICC = 0.78, mother ICC = 0.72, father ICC = 0.88), orientation (child ICC = 0.78, mother ICC = 0.82, father ICC = 0.92), affect (child ICC = 0.88, mother ICC = 0.86, father ICC = 0.87), and integration (child ICC = 0.81, mother ICC = 0.76, father ICC = 0.84). Because interrater reliability was good, the remaining interviews were distributed among the three raters and rated individually. To test whether raters had significant mean differences in their ratings of narrative coherence a univariate analysis of variance was conducted. An insignificant overall test suggested that there were no differences in average coherence ratings by rater, $F(2, 54) = .378, p = .687$. Narrative coherence across the three sections was highly consistent, justifying the consolidation of scores across self, mother, and father for each dimension (structure, orientation, affect, and integration) by calculating the mean score of the three coherence sections. Similar to previous studies (e.g., Achenbach & Rescorla, 2012; Adler, Wagner, & McAdams, 2007), we merged the four dimensions of coherence and created a mean score of total coherence, which was employed in all analyses.

Attachment coherence

Attachment coherence was scored based on the content from the CAI interviews. The CAI interviews are coded from 1 to 9 in 11 domains (e.g., coherence) that can all be used to provide an overall attachment classification for each attachment figure. In this study, only scores from the attachment coherence scale were used. Coding procedures for attachment coherence are as follows: Information from the attachment categories (idealization, preoccupied anger, dismissing) is taken into account when rating the overall coherence of the interview. Coherence is rated on a scale from 1 to 9 where 1 indicates low coherence (indicating consistent major and minor violations of coherence and no evidence of positive indexes of coherence) and 9 designates high coherence (no evidence of major violations, only one or two minor violations, and at least one positive index of coherence). Major violations of coherence are concerned with the degree of spontaneity or inhibition of the narratives (e.g., amount of interviewer prompts) and in particular the inconsistency and contradictoriness of the narratives (e.g., that the youth does not describe his father as trustworthy and later emphasizes how he would never want to become his father because he sees himself as a trustworthy person). Minor violations are concerned with dysfluency and perseveration (e.g., whether the youth becomes stuck in talking about something and cannot respond to the new demands of the interview). Excessive perseveration tends to link to either a disorganized or a preoccupied attachment classification. Positive indexes of coherence can increase the coherence score and include fresh speech (e.g., speech that reflects new thinking and understanding) and reflectiveness (e.g., the ability to appreciate and consider intentionality in oneself and others). Raters had undergone training with certified trainers and were required to reach a predetermined threshold before coding independently for this study. Specifically, to be qualified to code, on three separate sets of training videos (10 cases in each set), coders had to reach 80% agreement on categorical attachment classifications (not included in this study) based on the kappa statistic (.80). Based on 10% of the larger sample from which our sample was drawn, a significant two-way random ICC was found on the CAI coherence scale between two independent raters, $ICC = .73$, $p < .001$, indicating moderate reliability. Finally, we tested whether raters had significant mean differences in their ratings of coherence by running a univariate analysis of variance. An insignificant overall test suggested that there were no differences in average coherence ratings by rater, $F(5, 69) = .558$, $p = .73$.

Reflective functioning

The Reflective Function Questionnaire for Youths (RFQY; Shmueli-Goetz et al., 2008) is a 46-item self-report questionnaire, specifically designed for examining individual differences in reflective functioning. The RFQY was adapted from the adult RFQ items (Fonagy et al., 2016). In contrast to the gold standard interview-based measure of reflective functioning, this measure is more suitable for bigger samples.

The questionnaire and the interview-based measure have been demonstrated to be positively correlated ($r_s = .24$, $p = .004$; Ha, Sharp, Ensink, Fonagy, & Cirino, 2013). Responses are scored on a 6-point Likert scale ranging from *strongly disagree* to *strongly agree*, with two subscales computed. The 23 items constituting Scale A are median-scored so that responses reflecting an awareness of the opaqueness of mental states (*disagree somewhat* or *agree somewhat*) received the highest scores of 6, whereas extreme answers (*strongly agree* or *strongly disagree*) received the lowest scores of 2. An example of a Scale A item is "I always know what I feel." Items are then averaged to compute an overall subscale score for Scale A, with higher scores indicative of better reflective function in terms of understanding the opaqueness of mental states. Adolescents with optimal reflective function would receive a maximum averaged score of 6 on this scale and the lowest score would be a score of 2.

The 23 items constituting Scale B were polar-scored items such that a higher score indicated more optimal reflective function. For example, one Scale B item is, "In an argument, I keep the other person's point of view in mind," with responses of *strongly agree* scored as high reflective function and responses of *strongly disagree* scored as poor reflective function. Items are then averaged to create a Scale B overall subscale score. Adolescents with optimal reflective function would receive a maximum averaged score of 6 for Scale B and a minimum score of 1 indicating low reflective functioning.

Adequate reliability and validity for the RFQY was demonstrated in a sample of adolescents (Ha et al., 2013). In this sample, internal reliability for the RFQY was $\alpha = .75$ for Scale A and $\alpha = .69$ for Scale B.

Internalizing and externalizing problems

Participants completed the Youth Self-Report (YSR; Achenbach & Rescorla, 2001), a widely used measure of emotional and behavioral problems in childhood and adolescence. The YSR has well-established reliability and validity (Achenbach & Rescorla, 2001). In this study, *T* scores from the Internalizing Problems and Externalizing Problems scales were used. In this sample, internal consistency for the YSR was $\alpha = .94$.

Procedures

The study was approved by a human subjects review committee, and individuals participated after their parents provided informed consent and the adolescents themselves informed assent. During their stay in the hospital, adolescents were assessed by doctoral-level clinical psychology students, trained clinical research coordinators, or both, independently and in private rooms. Assessments were conducted within 2 weeks of being admitted to the hospital.

Table 2. Correlations between main study variables.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Narrative coherence ^a	1.69	.57	—	.45**	.03	.27*	-.37**	.01	—	-.14
2. Attachment coherence ^b	5.11	1.65	—	—	.16	.09	-.23	.10	—	.08
3. Reflective function Scale A	4.63	.55	—	—	—	.16	-.03	-.08	.03	.07
4. Reflective function Scale B	4.29	.41	—	—	—	—	.40**	.02	.21	-.01
5. Externalizing	58.57	11.83	—	—	—	—	—	.27*	-.02	.17
6. Internalizing	67.60	12.47	—	—	—	—	—	—	-.12	.10
7. CAI word count	4542.53	1986.35	—	—	—	—	—	—	—	-.28*
8. Participant age	15.37	1.37	—	—	—	—	—	—	—	—

Note: CAI = Child Attachment Interview.

^{a,b}Semipartial correlations are reported for the two coherence measures, controlling for the effects of CAI length (i.e., word count). Zero-order correlations are reported for the remaining variables.

* $p < .05$. ** $p < .01$.

Results

Gender differences in narrative coherence

Descriptive statistics showed means and standard deviations for narrative coherence (see Table 2). The scores indicated that adolescents, to some extent, constructed coherent narratives; however, the standard deviations revealed variation among adolescents. In terms of gender differences, independent samples *t* tests did not find statistically significant differences between the means of girls' narratives ($M = 1.71$, $SD = .57$) compared to boys' narratives ($M = 1.61$, $SD = .56$), $t(68) = .57$, $p = .57$, $d = 0.18$.

Correlations and semipartial correlations between main study variables

As expected, zero-order correlations showed that those with higher levels of narrative coherence tended to show higher attachment coherence evidencing a medium effect size ($r = .37$, $p < .01$). In addition, narrative coherence correlated positively with reflective functioning Scale B, showing a medium effect size ($r = .33$, $p < .01$), whereas the correlation between attachment coherence and reflective functioning Scale B was not statistically significant ($r = .07$, $p > .05$). Moreover, narrative coherence was significantly negatively correlated with externalizing symptoms ($r = -.35$, $p < .01$). The correlation between attachment coherence and externalizing problems was also negative and showed a trend toward statistical significance ($r = -.23$, $p > .05$). Internalizing symptoms were not significantly related to narrative coherence ($r = -.04$, $p > .05$) or attachment coherence ($r = .12$, $p > .05$). Reflective functioning Scale A was not significantly related to narrative coherence ($r = .04$, $p > .05$) or attachment coherence ($r = .15$, $p > .05$). In contrast to research on typical developing personality (Habermas & Bluck, 2000), narrative coherence was negatively, however not statistically, correlated with age ($r = -.23$, $p > .05$). Attachment coherence was not statistically correlated with age ($r = .11$, $p > .05$).

To examine whether the relations between narrative coherence and attachment coherence were affected by the length (i.e., number of words) of the CAI interviews, we ran a series of semipartial correlations controlling for the effect of CAI length on the relations between the coherence measures and all main study variables (see Table 2). Zero-order

correlations are reported for the relations between the remaining variables. Overall, the length of the CAI interview did not influence the correlations substantially: Adolescents with higher levels of narrative coherence still tended to show higher attachment coherence, evidencing a medium effect size. In addition, narrative coherence had a positive semipartial correlation with reflective functioning Scale B, evidencing a medium effect size, whereas the semipartial correlation between attachment coherence and reflective functioning Scale B was not statistically significant (see Table 2). Moreover, narrative coherence and reflective functioning Scale B were significantly negatively correlated with externalizing symptoms and the correlation between attachment coherence and externalizing problems was also negative, but small in magnitude and showing a trend toward statistical significance. Internalizing symptoms were not significantly related to narrative coherence, attachment coherence, and reflective functioning. Age and reflective functioning Scale A were not significantly related to any of the main study variables (Table 2).

Attachment coherence, reflective functioning, and CAI length as predictors of narrative coherence

To examine whether attachment coherence and reflective functioning Scale B both predicted narrative coherence, also controlling for CAI length, we ran a multiple regression analysis entering narrative coherence as the dependent variable and attachment coherence, reflective functioning, and CAI length as independent variables. The regression model was significant, $F(3, 59) = 11.78$, $p = .001$, adj. $R^2 = .34$) and showed that higher attachment coherence ($B = .11$, $SE = .03$, $p = .001$) and CAI length ($B = .00$, $SE = .00$, $p = .001$) significantly predicted higher narrative coherence, and reflective functioning was very close to significant ($B = .27$, $SE = .14$, $p = .053$).

Narrative coherence, attachment coherence, reflective functioning, and CAI length as predictors of externalizing problems

To examine whether narrative coherence predicted externalizing symptoms while controlling for CAI length, we conducted a multiple regression analysis entering narrative coherence and CAI length as predictor variables and

Table 3. Multiple regressions entering narrative coherence, attachment coherence, reflective functioning, and Child Attachment Interview (CAI) length as predictor variables and externalizing as outcome variable.

Outcome variable	Predictor variable	<i>B</i>	<i>SE</i>	Adj. <i>R</i> ²
Externalizing	Reflective functioning Scale B	-8.91*	3.33	.15
	Narrative coherence	-4.31	3.10	
	Attachment coherence	-.38	.86	
	CAI length	.00	.00	

* $p = .010$.

externalizing problems as dependent variable. Higher levels of narrative coherence ($B = -8.35$, $SE = 2.54$, $p = .002$), but not CAI length ($B = .00$, $SE = .00$, $p = .28$) significantly predicted less externalizing problems, $F(2, 67) = 5.41$, $p = .007$, adj. $R^2 = .11$. Next, we ran a multiple regression analysis entering narrative coherence, attachment coherence, reflective functioning Scale B, and CAI length as independent variables and externalizing as the dependent variable (see Table 3). When all four variables were included in the analysis, only higher reflective functioning remained a significant predictor of less externalizing problems when controlling for the other variables, $F(4, 58) = 3.64$, $p = .01$.

Discussion

This study is the first to provide evidence that Baerger and McAdams's (1999) coding scheme of narrative coherence can be extended to adolescents and rated from the CAI interview. As expected, adolescents were able to construct somewhat coherent narratives of discrete events; however, standard deviations revealed that there were individual differences in this ability, mostly related to level of externalizing pathology and age, but not gender. That is, narrative coherence was negatively correlated with age but not related to gender. Although controlling for CAI length, higher attachment security contributed to more coherent narratives of events and higher mentalization was close to significant. Finally, even after controlling for CAI length, more coherent narratives predicted less externalizing but not internalizing problems. In addition, when controlling for mentalization, attachment security, and CAI length, only lower mentalization remained a significant predictor of elevated externalizing behavior. Next, we elaborate on the implications of the results.

Gender and age differences related to narrative coherence

The finding that girls did not construct more coherent narratives than boys supports a previous study revealing no gender differences with respect to thematic coherence of events (Grysmann et al., 2016). Thus, although girls tend to tell more detailed, elaborated, and emotionally expressive narratives (e.g., Grysmann & Hudson, 2013), coherence seems to be a gender-neutral cognitive skill with a clear developmental trajectory. Surprisingly, higher age was related to lower narrative coherence, which is contradictory to theories and evidence in normal development suggesting an upward trajectory of narrative development throughout childhood and adolescence (e.g., Habermas & Bluck, 2000; Reese et al.,

2011). Because other coding systems (e.g., Reese et al., 2011) were constructed to assess developmental trajectories with special attention paid to childhood and adolescence it is possible that Baerger and McAdams's coding system simply does not capture developmental differences. However, results from previous studies have been based on adolescents transitioning through typical developmental tasks, whereas adolescents in this study were inpatients struggling with serious personal and mental challenges. Because many social-cognitive disturbances in adolescence worsen over time if treatment is not provided (e.g., Bateman & Fonagy, 2016; Merikangas et al., 2010; Sharp, 2014), it is possible that the oldest adolescents in this program reflect such severity. Future studies should examine whether higher age affected poor narrative coherence and poor mental health.

Relations between narrative coherence, attachment coherence, and mentalization

The effect size of the association between narrative coherence and attachment coherence was medium, which testifies to the uniqueness of these two operationalizations of coherence as concepts. In addition, the coherence measures related in different ways with CAI length, age, and mentalization, which further supports the uniqueness of the two concepts as a measure of attachment security (i.e., attachment coherence) and a measure of the completeness of the narrative's architecture (i.e., narrative coherence). Results also support previous research showing that attachment security contributes to more coherent narratives (Etzion-Carasso & Oppenheim, 2000; Gini, Oppenheim, & Sagi-Schwartz, 2007; Zaman & Fivush, 2013) and extends these studies by demonstrating that lower levels of attachment security contribute to less coherent narratives in a clinical group of adolescents.

Better mentalization independently contributed to more coherent narratives of events, which extends a recent study by emphasizing that mentalization not only contributes to more coherent life narratives (Köber et al., 2018), but also discrete event narratives. Thus, the ability to mentalize one's own and others' mental states such as feelings, intentions, goals, and thoughts seems fundamental to tailor a structured and reflective narrative of the past. For example, both mentalization and the integration dimension of coherence are reflective, meaning-making processes, although with different focus. Whereas mentalization includes understanding mental states in oneself and others, the integration dimension of narrative coherence includes establishing connections between the event and the self; additionally, whereas mentalization (i.e., reflective functioning) mainly includes a here and now focus, the integration dimension of coherence encapsulates the past event and relates it to the present self. One might argue that mentalization is the reflective meta-cognitive-affective process by which narrative coherence, including the integration dimension, can be formed. Future studies should continue the investigation of the relation between narrative coherence and other social-cognitive aspects and how their interaction could lead to disturbances in adolescence.

Poor narrative coherence contributing to more externalizing but not internalizing problems

Adolescents' narratives with low coherence tended to fail to introduce main characters and to situate the episode in a specific temporal, social, and personal context. They also lacked temporal or logical order. That is, highly coherent stories would incorporate the following aspects: an initiating event; an internal response to this event (e.g., a goal, plan, thought, feeling); an attempt (e.g., to reach a goal, carry out a plan, remedy a crisis, resolve a state of emotional disequilibrium); and a consequence (Baerger & McAdams, 1999). Thus, less coherent narratives might contribute to elevated externalizing behavior because poor abilities to create structured and well-oriented stories might also reflect a lowered ability to carry out well-structured and thoughtful actions in real life. In addition, individuals tend to retrieve past events with the objective of guiding present problem solving or directing future behavior (Bluck & Alea, 2011; Pillemer, 1998); therefore, future studies should examine whether individuals with less coherent narratives do not use their memories to direct behavior because memories are more confusing, fragmented, and difficult to derive meaning from, subsequently leading to less adaptive behavior. Interestingly, when narrative coherence, attachment coherence, and mentalization were included in the analysis, mentalization remained a significant predictor of externalizing behavior, independent of narrative coherence, whereas attachment coherence did not. This suggests that mentalization might play a unique role alongside narrative coherence. Thus, the ability to reflect on the minds of oneself and others might be the most fundamental process contributing to more controlled and adaptive behavior. This finding seems reasonable because the ability to mentalize has been found to play an important role for regulating impulses, affects, and behaviors within the demands of the environment (e.g., Bateman & Fonagy, 2016; Sharp et al., 2014).

The results did not show a relation between narrative coherence and internalizing problems, which is somewhat surprising given the large body of research emphasizing that adults (e.g., van Vreeswijk & de Wilde, 2004) and adolescents (Kuyken & Howell, 2006; Kuyken, Howell, & Dalgleish, 2006; Park, Goodyer, & Teasdale, 2002) with depression produce overgeneralized memories rather than locating the events in a specific time and place. The finding should be replicated because the current measure might not be suitable for examining such relations.

Future studies could potentially benefit from implementing measures from other fields such as the Referential Activity (RA), a widely validated linguistic measure that examines how nonverbal experience, including imagery and emotional experience, is connected to language (Bucci, 2002). Language high on RA is characterized by being vivid and clear, and indicates immediacy of engagement for the speaker in the moment and evokes a similar experience in the listener. RA encompasses four dimensions: specificity (quantity of detail), imagery (degree to which language evokes imagery), clarity (organization and focus), and concreteness (degree of reference to sensory and other bodily

experience; Bucci & McKay, 2014) and has been applied to many types of texts such as brief monologues, early memories, Thematic Apperception Test protocols, and therapy transcripts. Thus, this measure has a broader take on narratives than the coherence measure of personal past events used in this study. However, because the RA measure (especially the clarity scale) does tap into the organization and meaning derived from the narrative, it could be a viable measure to use when exploring narrative coherence related to internalizing problems in future studies.

Study limitations

There are several limitations to this study. Most important, the study is correlational and we cannot determine cause-effect relations between the constructs; longitudinal studies are warranted to examine the dynamic relations that are more likely to exist between these constructs. Moreover, because this is the first study to apply Baerger and McAdams's coding scheme to adolescents and the CAI interview, future studies should compare both nonclinical and clinical groups (given the high comorbidity in this study) to examine the specificity of the findings. Finally, because only one of the mentalization dimensions was significantly related to narrative coherence, future studies should examine this relation using additional measures of mentalization, given the limitation of self-report measures of social cognition (e.g., Fonagy, Bateman, & Bateman, 2011).

Conclusion

Narrative coherence broadly refers to the structural completeness of past events and encompasses dimensions of orientation, structure, affect, and integration in this study. For the first time, Baerger and McAdams's (1999) well-validated coding scheme of narrative coherence was applied to inpatient adolescents and elicited from the content derived from the CAI in relation to attachment coherence, mentalization, and internalizing and externalizing problems. The coding scheme was found to be applicable to inpatient adolescents and the CAI transcripts, indicating a promising new path in research on narrative coherence. Narrative coherence was negatively correlated with age and no gender differences were found. Both higher attachment security and better mentalization contributed to more coherent narratives. More coherent narratives predicted less externalizing problems but mentalization was the strongest predictor of this relation. Thus, when providing early intervention for adolescents with externalizing behavior, narrative coherence alongside mentalization should be taken into account.

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