The Relationships Among Rumination, Narrative Coherence, and Well-Being in a Community Sample of Adolescents

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A thesis submitted to Victoria University of Wellington
In fulfillment of the requirements for the degree of
Master of Science in Psychology

Victoria University of Wellington 2016

Abstract

The ability to tell a coherent autobiographical narrative, in particular the ability to link life events to ones sense of self (causal coherence) and to develop a consistent theme and achieve a sense of resolution in one's memory narratives (thematic coherence), is related to increased well-being in adults. In contrast, in early-adolescence, increased causal and thematic coherence are associated with decreased psychological well-being but the reason for this is unclear. The current study examined whether rumination mediated the relationships between narrative coherence and both life satisfaction and depression in a community sample of 190 adolescents (mean age = 16.31 years). Contrary to prediction, causal and thematic coherence were positively related to life satisfaction and negatively related to depression. Participants were less proficient in causal than thematic coherence, and rumination was a weak mediator of the relationships between causal, but not thematic, coherence and both life satisfaction and depression. In contrast, thematic coherence was found to moderate the relationship between rumination and life satisfaction for the whole sample, and also the relationship between rumination and depression for male participants with a moderate to high tendency to ruminate. Results indirectly support the theory that rumination mediates the negative relationship between narrative coherence and well-being found in early adolescence. By mid-adolescence however, individuals appear to be proficient in the use of narrative coherence and this increased proficiency may help to improve their well-being. Longitudinal research examining the relationships among narrative coherence, rumination, and well-being throughout adolescence is needed to better understand the unique ways in which causal and thematic coherence serve to influence adolescents' psychological functioning.

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The way we remember, in particular our memories for our autobiographical experiences, is central to how we negotiate our world. The way in which we construct and share memories of our past experiences help us to learn about emotion and how to regulate it (Fivush & Sales, 2006; Sales & Fivush, 2005), what behavior will be helpful or harmful to us in the future (Williams, 2006), and also provides us with an understanding of our identity and how we developed to be who we are (Conway & Pleydell-Pearce, 2000; McAdams, 2001). Given the important role of autobiographical memory in shaping behavior, emotion regulation, and identity, it is unsurprising that the way we narrate our past experiences is related to our psychological well-being (Baerger & McAdams, 1999; Chen, McAnally, Wang, & Reese, 2012).

The ability to place events in time, link life events to one's sense of self, values, or life perspective, develop a consistent theme, and achieve a sense of resolution in one's memory narratives is defined as narrative coherence (Habermas & Bluck, 2000). Narrative coherence has been found to relate to increased psychological well-being and a lack of psychopathology in adults (Baerger & McAdams, 1999; Habermas & Bluck, 2000). During adolescence however, the relationship between narrative coherence and well-being is more complex. Research has found that increased coherence in early adolescents' narratives of autobiographical experiences, particularly experiences perceived as important to one's sense of self, is associated with decreased psychological well-being (Chen et al., 2012; McLean, Breen, & Fournier, 2010). By late adolescence this relationship appears to reverse to match that found in adult populations, that is increased narrative coherence is associated with increased psychological well-being (McLean et al., 2010; Reese, McAnally, Wang, & Chen, 2015). The point in adolescence at which the change in the nature of the relationship between narrative coherence and well-being occurs is unclear.

Theoretical perspectives on the relationship between narrative coherence and well-being in early-adolescence propose that the negative relationship between these variables may be associated with early-adolescents' limited emotion regulation skills (Chen et al., 2012; McAdams, 2008; Reese et al., 2015). The current study was the first to test this theory by examining whether the specific emotion regulation technique of rumination mediates the relationship between adolescents' narrative coherence and their psychological well-being. To do this, turning point narratives were collected from 190 adolescents at one time point, and coded for the presence and sophistication of narrative coherence. Relationships between

participants' level of narrative coherence and their scores on measures of rumination, life satisfaction, and depression were then examined. The results contribute to a better understanding of the function of narrative coherence in autobiographical memory and well-being across development.

Narrative Coherence as a Form of Meaning Making

Narrative theory posits that the way we tell our autobiographical narratives play a key role in deriving meaning from, or making sense of, our life experiences (Habermas & Bluck, 2000; McAdams, 2001, 2008; Pasupathi, Mansour, & Brubaker, 2007). Theorists propose that drawing meaning from our life experiences, particularly negative events, is central to regulating the emotions they arouse, and serves to influence well-being (Habermas, 2011; Pals, 2006; Park, 2010). One aspect of autobiographical narrative style that is thought to function to derive meaning from experience is narrative coherence (Habermas & Bluck, 2000; Köber, Schmiedek, & Habermas, 2015; McAdams, 2006). A coherent memory narrative is one that places an event or events in a temporal framework, develops and maintains a theme across the event or life narrative, provides causal-motivational information to explain how the event arose or the consequences of the event for the self, and adheres to culturally appropriate concepts of biography (Bauer & Fivush, 2010; Habermas & Bluck, 2000).

Theorists propose that narrative coherence functions to imbue autobiographical narratives with meaning by illuminating the relevance of a life experience to the self and drawing out self-relevant themes across autobiographical experiences. These functions of narrative coherence facilitate integration of one's experiences into a coherent sense of identity across time (Grysman & Hudson, 2011; Habermas, 2011; McAdams, 2006; Reese et al., 2011). Two types of coherence are thought to instill a narrative with a sense of self-relevance and meaning; these are causal coherence and thematic coherence (Chen et al., 2012; Fivush, Habermas, Waters, & Zaman, 2011; Köber et al., 2015).

Causal coherence is a form of self-reflective reasoning about one's past, in which individuals construct narratives that explain how events in their life are connected to, or have caused, specific actions or changes in their personality, values, or world-view (Chen et al., 2012; Habermas & Bluck, 2000; Köber et al., 2015; McAdams, 2001; Reese et al., 2015). Without causal coherence, an autobiographical narrative bears minimal relation to the self and is essentially meaningless (Habermas & Bluck, 2000).

Causal coherence has been examined in the context of narrative accounts of both single life episodes and the complete life story. Within these narrative structures causal coherence has been measured in diverse ways, including the presence of internal state

language indicating causality (e.g. '*because*', '*this caused…*', '*this made me…*'; Habermas & de Silveira, 2008); statements or explanations presenting life events as having caused changes in one's personality or personal development (self-event connections explaining change; Habermas & Köber, 2015; Reese et al., 2015); and autobiographical arguments that are used to explain changes in personality or behaviour, for example learning a lesson about appropriate action in a specific situation (e.g. "*I learned I should be nice to my brother or he will hit me*"), or learning a life maxim or generalised insight (e.g. "*this taught me you have to rely on yourself and work hard to get ahead in life*"; McLean & Pratt, 2006; Reese et al, 2015). The latter two measures (that is self-event connections explaining change and autobiographical arguments regarding lessons learned or insights) provide a better means to capture the concept of causal coherence as an explanation or reflection on how life events impact on the self, or what they mean for the self; they also allow for measurement of the degree of elaboration that individuals use when linking events to the self, in other words, how sophisticated their use of causal coherence is. As such, these measures are likely to be more sensitive and appropriate methods for measuring individual variation in causal coherence across populations. The current study utilised Reese and colleagues' (2014) scheme for coding causal coherence in memory narratives, as this provides a measure of both the presence of self-event connections and the level of sophistication of the individual's explanation for how an event impacted on the self.

The conceptualisation of thematic coherence differs slightly across life story and single-event narratives. In a life-story narrative, thematic coherence is the implicit or explicit development of an overarching theme between various events or aspects of life (Habermas & Bluck, 2000). In the context of a single-event narrative, thematic coherence is the development, elaboration, and resolution of a central theme, established through links to emotion and other autobiographical events (Chen et al., 2012; Habermas & Bluck, 2000; Reese et al., 2014). From a theoretical perspective, thematic coherence contributes to the narrative meaning making process in several ways. First, by highlighting the themes that integrate one's life episodes, thematic coherence conveys a general concept of who an individual is (McAdams, 2001). Second, thematic coherence may be used to create a sense of stability in the self over time, for example by explaining how diverse actions all stemmed from a stable, underlying characteristic of the self (Köber et al., 2015). Third, thematic coherence communicates how the theme running through a life event or life story is developed, maintained and resolved (Chen et al., 2012; Reese et al., 2014). This narrative resolution process likely contributes to gaining a sense of meaning from an event and may

also help to regulate emotions aroused by life events, particularly negative experiences, which are more likely to demand resolution than positive experiences (McAdams, 2008; Pals, 2006).

As for causal coherence, thematic coherence has also been examined in the context of both single event and life narratives, and has been measured in a variety of ways across the research literature. Operational definitions of thematic coherence have included the presence of cognitive processing words indicating subjective processing of the meaning of events (e.g. '*realised*', '*understood*'; Waters, Shallcross, & Fivush, 2013); explanations of events as caused by stable personality traits (self-event connections explaining stability; Köber, 2015); the use of a specific event or action as an exemplifier of a personal trait or of a series of similar events or actions (Habermas & de Silveira, 2008; Köber et al., 2015); and the extent to which an identifiable theme is developed and resolved across a single-event narrative, or to which disparate life events are thematically connected or implicitly similar across a life narrative (Chen et al., 2012; Köber et al., 2015; Reese et al., 2014).

The use of single-word representations of thematic coherence may be too simplistic to adequately capture the concept of thematic coherence as establishing stability in ones sense of self or coherency across a life event narrative. The explanation of events as caused by specific personality traits captures the concept of thematic coherence as creating a sense of stability in the self over time but, in and of themselves, such statements do not require an individual to draw thematic connections between life events. As such, the latter two measures (that is the use of an event as an exemplifier of a personal trait or series of events, and the development and resolution of a theme across a life event or events) provide a better measure of the presence and sophistication of an ability to draw thematic connections between events or important aspects of the self, and to use such connections to obtain a sense of resolution, or to establish a sense of coherency or stability in one's life or identity over time. The current study utilised Reese and colleagues' (2014) scheme for coding thematic coherence, as this is designed to measure the development, maintenance, and resolution of a theme across a single life event narrative.

In summary, both causal and thematic coherence convey the individual's interpretation of events in terms of their relation to the self and can be thought of as the building blocks of narrative meaning making (Habermas & Bluck, 2000). Causal and thematic coherence have been found to be related but independent dimensions of narrative coherence (Reese et al., 2014; Reese et al., 2011; Waters et al., 2013), and display similar developmental trajectories (Köber et al., 2015).

The Development of Narrative Coherence

The narrative structuring of autobiographical memory requires many diverse skills, including an understanding of the self as a unique, conscious individual that exists across time; the capacity to encode, store and retrieve perceptual data in or from memory; and socio-emotional skills, such as the ability for language, perspective taking, inference and abstract causal reasoning (Habermas & Bluck, 2000).

Research has found that the skills required to construct autobiographical memories and begin to link them together emerge in childhood (Fivush et al., 2011; Habermas & Bluck, 2000; Köber et al., 2015). It is not until adolescence however, that social and cognitive skills are sufficiently developed to enable the more complex task of narrative meaning making through causal and thematic coherence; that is, the task of integrating autobiographical memories with the self, to obtain an understanding of the meaning of the event to the self and create a coherent sense of self across time (Habermas & Bluck, 2000; Köber et al., 2015). The major jump in narrative coherence ability occurs in early to mid adolescence for causal coherence, and slightly later, in mid to late adolescence, for thematic coherence, but these skills continue to develop and improve into early adulthood (Habermas & Bluck, 2000; Köber et al., 2015; McLean & Breen, 2009). The developing state of narrative coherence skills across adolescence may have implications for the relationship between narrative coherence and psychological well-being during this developmental period.

Narrative Coherence and Well-Being in Adults

Research examining the relationship between narrative coherence and well-being in adult samples has been solely correlational in nature, and therefore cannot establish causality. Studies to date provide support for the assumption that narrative coherence is positively related to well-being, however. In adulthood, higher causal and thematic coherence have been found to be positively associated with diverse measures of well-being, such as life satisfaction (Baerger & McAdams, 1999) and ego development (Adler, Skalina, & McAdams, 2008; Adler, Wagner, & McAdams, 2007). Waters and Fivush (2014) reported a positive correlation between thematic coherence and both self-reported life purpose and meaning and positive interpersonal relationships. Causal coherence has also been found to have a positive relationship with composite measures of subjective and psychological wellbeing (Lilgendahl & McAdams, 2011), as well as positive adjustment in the form of moderate levels of self-restraint (Blagov & Singer, 2004). Furthermore, both causal and thematic coherence have been found to be negatively associated with depression (Baerger & McAdams, 1999) and other psychiatric symptoms or disorders (Adler, 2012; but see Waters et al., 2013, who found

a positive relationship between causal and thematic coherence and PTSD). The positive relationship between narrative coherence and well-being has been found when narrative coherence is measured in the context of both whole life-story, and single life-event, narratives (e.g. Baeger & McAdams, 1999; Waters et al., 2014; Waters et al., 2013).

Narrative Coherence and Well-being in Adolescence

Compared to research in adult samples, studies examining the relationship between narrative coherence and well-being in adolescent populations are limited. Furthermore, the longitudinal or experimental studies required to establish causality have not yet been conducted. Research to date suggests the positive relationship between narrative coherence and well-being found in adult samples does not extend to adolescents, however. During early to mid-adolescence, narrative coherence has been found to be negatively related to well-being; this relationship then tends to reverse from late adolescence to emerging adulthood onwards (e.g. McLean et al., 2010; Chen et al., 2012; Reese et al., 2015). McLean and colleagues' (2010) cross-sectional study examined the relationship between well-being and causal coherence in the autobiographical memory narratives of adolescent males. Well-being was operationalised as the average of participants' scores on measures of depression and self-esteem. Causal coherence was defined as the presence of self-event connections, but the complexity of causal coherence was also measured in terms of the level of sophistication of the meaning or insight gained from the narrated life experience. Self-event connections indicating a change in the self were found to be positively related to well-being across adolescence. In contrast, the presence of more sophisticated causal coherence in memory narratives predicted lower well-being for younger adolescent males (11-13 years), but there was a trend for this relationship to have reversed by late adolescence (17-18 years) (McLean et al., 2010).

McLean and colleagues (2010) suggest self-event connections are a relatively basic autobiographical reasoning skill that has been mastered by early adolescence. By comparison, the ability to draw sophisticated insight from life experiences is a more complex form of causal coherence, requiring one to reflect on the meaning of a self-event connection for one's identity and it's broader relevance to one's life. It is not until late adolescence that people reach proficiency in this more complex form of causal coherence, as it requires a robust understanding of temporal and narrative structure and life script knowledge, as well as an established diachronic concept of self (Habermas & de Silveira, 2008; Köber et al., 2015). According to McLean and colleagues (2010), attempts to draw insights from life experiences prior to developing proficient causal coherence skills may cause a sense of confusion,

uncertainty or loss of control, leading to psychological distress. Indeed several studies suggest the level of narrative coherence (both self-event connections and more elaborative meaning making) displayed in memory narratives increases across adolescence, supporting the theory that these skills are still developing and increase in proficiency during this developmental period (Chen et al., 2012; Köber et al., 2015; McLean et al., 2010).

Park (2010) reviewed research examining the relationship between various types of meaning making and adjustment to negative life events, which provides some support for Mclean and colleagues' (2015) interpretation of their study's results. Park's (2010) review drew a distinction between attempts at meaning making and meaning made. Meaning making was defined as the process of reducing the discrepancy between the initial meaning that one draws from an event and one's beliefs, values or goals, whereas meaning made is the product of the meaning making processes (i.e. a feeling or tangible outcome indicating the discrepancy has been reduced).

Park (2010) noted that several studies report no correlation between attempts to draw meaning from negative events and actually obtaining meaning. Furthermore, research that has differentiated between meaning making and its product has found that attempts at meaning making are generally associated with increased distress, whereas meaning made is associated with increased adjustment (Park, 2010). However, none of the studies reviewed investigated meaning making in adolescent populations or focused specifically on narrative coherence as the meaning making process. In addition, the review did not identify factors associated with whether the meaning making process is successful or not.

One skill that is still developing across adolescence, and that may influence the relationship between well-being and meaning making in the form of narrative coherence, is emotion regulation (Greenhoot & McLean, 2013). Chen and colleagues (2012) examined whether causal and thematic coherence in adolescents' low- and high-point narratives was related to their psychological well-being or pro-social behavior. The study was cross-sectional and examined age effects across early- (12-14 years), mid- (15-17 years), and late- (18-21 years) adolescence. Causal coherence was defined as the extent to which narratives contained, and elaborated on, a link between the life event and changes to the narrator's personality or personal development (e.g. values, world view or life philosophy). Thematic coherence was defined as the extent to which the narrative developed and resolved a coherent theme and integrated the event or theme into the narrator's life through emotional evaluation and links to other autobiographical experiences (Chen et al., 2012). The measures of narrative coherence utilised in the study took into account whether the particular dimension of coherence was

present in a narrative as well as the level of sophistication to which it was expressed. A composite measure of well-being was created, defined by higher levels of life satisfaction and self-esteem, coupled with lower levels of depression and internalising and externalising behavior.

In line with McLean and colleagues' (2010) findings, Chen and colleagues (2012) found that higher levels of causal coherence in low-point narratives were positively related to pro-social behavior for older adolescents only. No significant relationships were found between causal coherence and well-being however, perhaps due to the broad range of measures included in the well-being composite scale in comparison to the well-being measure employed by McLean and colleagues (2010). In contrast to the results relating to causal coherence, no significant relationships were found between thematic coherence and pro-social behavior. Higher levels of thematic coherence were related to lower levels of well-being in young adolescent boys, however (Chen et al., 2012).

Chen and colleagues (2012) suggest that emotion regulation skills may be one mechanism influencing the negative relationship found between thematic coherence and well-being during adolescence. They propose that narrating adverse life experiences is likely to arouse negative emotions that younger adolescents may not yet have the skills to regulate. Thus, in early- to mid-adolescence, attempts at narrative coherence may reflect maladaptive emotion regulation in the form of rumination. In other words, individuals get caught up in repetitive thinking about the causes and consequences of negative events without active problem solving (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), which prevents successful resolution or integration of an experience into one's sense of self (Chen et al., 2012). This may also explain why causal coherence was positively associated with pro-social behavior for older adolescents only; in older adolescents with more advanced emotion regulation skills, pro-social behaviour may represent the use of proactive coping in response to a negative event in order to avoid similar negative experiences in the future.

Reese and colleagues (2015) posited a similar rumination hypothesis to interpret the results of their cross-sectional study examining the relationships between narrative coherence and well-being and psychopathology in the turning point narratives of New Zealand adolescents. Turning point narratives are narratives for an event that an individual views as critical in causing a change in their personality or personal development; such events are inherently self-defining (Reese et al., 2015). Narrative coherence was conceptualised as the two independent constructs of causal coherence and thematic coherence, defined as for Chen and colleagues' (2012) study outlined above. Reese and colleagues (2015) found that causal

coherence was positively related to self-esteem and life satisfaction for older adolescents (18-21 years), whereas causal coherence and life satisfaction were inversely related for young adolescents (12-14 years). Causal coherence was unrelated to depression across adolescence. No significant relationships were found between thematic coherence and depression and thematic coherence was positively associated with life satisfaction for participants of Maori ethnicity only.

In line with the theory put forward by Chen and colleagues (2012), Reese and colleagues (2015) suggest the difference in the relationship between narrative coherence and well-being found for individuals in early- and late-adolescence is due to late-adolescents' increased ability to utilise narrative coherence to regulate emotions aroused by negative events. This increased skill in narrative coherence allows them to reinterpret negative experiences as valuable or positive for the self, thereby enhancing their self-esteem and life satisfaction (Reese et al., 2015). In contrast, younger adolescents' limited emotion regulation skills may mean they get more caught up in the negative aspects of an event and inadvertently fall into rumination when attempting to derive meaning from adversity, leading to decreased life satisfaction and increased distress in the face of negative emotions (Reese et al., 2015).

With regard to the changing relationship between narrative coherence and well-being across adolescence, Reese and colleagues (2015) suggest that future research should examine whether the development of emotion regulation skills influences the relationship between narrative coherence and well-being. Specifically, do young adolescents who engage in increased narrative meaning making in the face of adversity inadvertently fall into the trap of rumination?

Whilst research suggests narrative coherence is associated with decreased well-being in early-adolescence (Chen et al., 2012; McLean et al., 2010; Reese et al., 2015), few studies have examined the relationship between narrative coherence and well-being during mid-adolescence and the results of these studies have been mixed. For the most part, previous research has found a non-significant relationship between narrative coherence and well-being or psychopathology in mid-adolescence, the definition of which ranges from between 15 to 17 years of age across studies (McLean et al., 2010; Reese et al., 2015). With the exception of a larger sample of 92, the size of the mid-adolescent samples examined by these studies has been relatively small however, ranging from 31 to approximately 50 participants. Furthermore, the direction of the relationship between narrative coherence and well-being in mid-adolescence varies across studies, with two studies reporting a negative relationship between causal coherence and well-being (operationalised as increased self-esteem and

decreased depression) or life satisfaction (McLean et al., 2010; Reese et al., 2015), one reporting a positive relationship between thematic coherence and pro-social behavior (Chen et al., 2012), and one study failing to report the direction of the relationships found between thematic coherence and measures of either well-being or depression (Reese et al., 2015). Thus, it is unclear exactly when in adolescence narrative coherence switches from being negatively associated with well-being to positively associated with it.

The varied relationships found between both causal and thematic coherence and well-being and psychopathology across the studies examined above are likely due to the different age of the study samples, as well as methodological differences in the way the narrative coherence variables were defined and well-being and psychopathology were measured. Further research into the relationship between narrative coherence and well-being in a broad range of adolescent populations, as well as the factors associated with this relationship, is needed in order to better understand the nature of this relationship.

Taken together, theoretical perspectives and research into the relationship between narrative coherence and well-being in adolescent samples suggests that attempts to obtain meaning through narrative coherence may be detrimental for early-adolescents who do not yet have sufficient cognitive and emotional maturity to effectively draw meaning from negative life experiences and integrate them into their sense of identity (e.g. Reese et al., 2015; Chen et al., 2012; Greenhoot & McLean, 2013). Instead, for these individuals, attempts at meaning making via narrative coherence may be left unresolved and inadvertently lead to rumination about negative experiences and the emotions they arouse, increasing distress and decreasing well-being (Reese et al., 2015). This would suggest that a tendency to use rumination as a coping mechanism might mediate the relationship between narrative coherence (causal and thematic) and wellbeing in early- to mid-adolescence. It is also possible that decreased well-being leads to increased rumination, triggering increased attempts at meaning making via narrative coherence, however. The hypothesis that rumination mediates the negative relationship between narrative coherence and well-being found in early-adolescence is yet to be directly tested, but an examination of research into rumination provides tentative support for its explanatory worth.

Rumination and Narrative Meaning Making

Rumination is a form of abstract, repetitive thinking about the causes, consequences and meaning of one's previous life experiences (Nolen-Hoeksema et al., 2008). Rumination tends to be both negative and self-referential in nature (Nolen-Hoeksema et al., 2008; Ray et al., 2005). Liverant, Kamholz, Sloan, and Brown (2011) propose that rumination is an

emotion regulation strategy, in that its abstract, perseverative focus on the causes and consequences of past events functions to avoid or suppress more intense negative affect that would be aroused by focusing explicitly on the physiological, behavioural or subjective aspects of adverse emotions.

Individuals report engaging in rumination in an attempt to gain insight into the meaning of negative experiences or problems (Nolen-Hoeksema et al., 2008). Rumination is a maladaptive emotion regulation strategy, however, because its passive and avoidant nature reduces active problem-solving and opportunities to obtain a sense of efficacy over one's problems (Liverant et al., 2011; Nolen-Hoeksema et al., 2008). Research has found that individuals prone to rumination are less able to inhibit negative emotional information (Joormann, 2006), and tend to respond to aversive emotion by attempting to suppress or avoid it (Dickson, Ciesla, & Reilly, 2012; Moulds, Kandris, Starr, & Wong, 2007; Wenzlaff & Luxton, 2003). Rumination has been found to lead to increased emotional distress over time (Liverant et al., 2011; Nolen-Hoeksema et al., 2008).

The research literature provides strong support for the maladaptive nature of rumination as an emotion regulation strategy. One of the most robust findings in psychology research is a strong, positive relationship between rumination and depression (Nolen-Hoeksema et al., 2008; Watkins, 2008). Rumination predicts the onset of depression in both adults and adolescents (Burwell & Shirk, 2007; Nolen-Hoeksema, 2000) and interacts with a negative cognitive bias to predict the duration of depression (Nolen-Hoeksema et al., 2008; Robinson & Alloy, 2003). Furthermore, rumination is negatively related to well-being (operationalised as life satisfaction; McCullough, Bellah, Kilpatrick, & Johnson, 2001) and also predicts reduced well-being in adolescents (operationalised as life satisfaction and eudaemonic wellbeing, or increased identity commitment, identity integration and self-esteem and decreased depressive symptoms, respectively; Harrington & Loffredo, 2010; Luyckx et al., 2007).

In summary, rumination is conceptualised as a failed attempt to obtain insight into one's negative experiences or feelings that ultimately leads to negative, perseverative thinking, a lack of instrumental and problem-solving behavior, and also increased risk of depression. Adolescents who have not yet gained proficiency in the skills of emotion regulation and narrative coherence, may inadvertently fall into ruminative thinking when searching for meaning in their past experiences. The empirical research on the outcomes of rumination indicate the pathway by which failed attempts at narrative meaning making might lead to increased emotional distress, or decreased well-being, through increased ruminative

thinking. The current study investigated the relationships between rumination and narrative coherence (causal and thematic), and examined whether rumination mediated the relationship between narrative coherence and well-being or psychopathology in mid-adolescence.

Gender Differences in Rumination

Gender differences found in levels of rumination suggest it may be important to consider the effects of gender on the relationships among narrative coherence, rumination, and well-being or psychopathology. Gender has been found to influence the tendency to ruminate (Jose & Brown, 2008; Nolen-Hoeksema et al., 2008). Although levels of rumination increase markedly during adolescence for both sexes (Nolen-Hoeksema et al., 2008), female adolescents' rates of rumination are double that of males, and this difference continues into adulthood (Butler & Nolen-Hoeksema, 1994; Nolen-Hoeksema et al., 2008). Furthermore, females' increased levels of rumination predict higher levels of depression in females than males, beginning in early adolescence (Butler & Nolen-Hoeksema, 1994; Jose & Brown, 2008).

Research suggests the higher rates of rumination in females compared to males may be due to socialisation processes; mothers discuss the nature and social context of emotional experience more with daughters, but talk about the causes and consequences of emotions aroused by life events more with sons (Fivush, 1989; Fivush, Brotman, Buckner, & Goodman, 2000). In turn, elaborative maternal reminiscing about the causes and consequences of negative life experiences has been found to be positively correlated with a more consistent self-concept in children (Bird & Reese, 2006), as well as improved emotional understanding, emotion regulation, and coping skills (Fivush & Sales, 2006; Sales & Fivush, 2005). Grysman and Hudson (2013) suggest that mothers' greater tendency to discuss the cause and consequences of emotions with sons may encourage males to develop a greater sense of agency in dealing with emotional problems than females. In comparison to males, females may be socialised to focus on experiencing, rather than resolving emotion, and to adopt more passive coping strategies, such as rumination, in response to emotional events (McClean & Hope, 2010). Females' reduced experience in discussing the cause and consequences, or meaning, of emotional events, coupled with an increased tendency to ruminate, means they may be more susceptible to falling into rumination when attempting to use narrative coherence to integrate life experiences into their sense of self. As such, rumination might be expected to play a greater mediating role in the relationship between narrative coherence and well-being for adolescent females than for males.

Gender Differences in Narrative Coherence During Adolescence

In contrast to the clear gender difference in levels of rumination during adolescence, findings of gender differences in adolescents' narrative coherence and its relationship to well-being have been mixed. Many studies report no gender differences in the degree of causal coherence in adolescents' life story or self-defining event narratives (Chen et al., 2012; Habermas & de Silveira, 2008; McLean & Breen, 2009). Köber and colleagues (2015) conducted a longitudinal, cohort study in which they investigated the development of narrative coherence in the life story narratives of 172 individuals ranging from 8 to 69 years of age. They found no gender differences in the level of causal coherence in life story narratives at any age, including the adolescent period.

In contrast, several studies have found that female adolescents display higher levels of causal coherence than males. In a study of 65 racially and ethnically diverse 13 to 16 year olds, Fivush and colleagues (2012) found that, compared to males, female adolescents displayed more advanced causal coherence, defined as increased self-insight from their past experiences, in their personal narratives. In their cross-sectional study of narrative coherence in the life story narratives of 268 adolescents ranging from 12 to 18 years of age, Reese and colleagues (2014) found developmental increases in causal coherence occurred earlier in adolescence for females than males. A later study that examined narrative coherence in turning point narratives from the same sample found that New Zealand Chinese female adolescents displayed higher levels of causal coherence than males. No gender differences were found in levels of causal coherence in New Zealand European and New Zealand Maori turning point narratives (Reese et al., 2015).

The mixed results found for gender differences in causal coherence during adolescence may be due to methodological variation across studies. For instance, studies differ in participant culture, the way causal coherence is operationalised, and whether life story or single-event narratives are examined. Further research is needed to better understand when and why gender differences in levels of causal coherence are found in adolescents' personal narratives.

Gender effects on thematic coherence are more consistent than those found for causal coherence. A lack of gender effects on thematic coherence of life story and turning point narratives has been found across a culturally diverse sample of New Zealand adolescents (Reese et al., 2014; Reese et al., 2015), and across the lifespan (Köber et al., 2015). Thus, male and female adolescents appear to be similarly skilled in their ability to coherently develop and resolve a theme in their personal narratives.

Gender Effects on the Relationship Between Narrative Coherence and Well-Being

Research examining gender effects on the relationship between narrative coherence and well-being in early adolescence is limited and has produced mixed results. McLean and Breen's (2009) cross-sectional study of 12 to 18 year old adolescents found that the interpretation of a negative event as positive for the self (i.e. positively-valenced causal coherence) in self-defining event narratives was associated with higher self-esteem for males, but not females. In contrast, Chen and colleagues' (2012) cross-sectional study found that increased thematic coherence in 12 to 21 year old adolescents' narratives for a high point in their life was associated with decreased well-being, operationalised as a composite of increased self-esteem and life satisfaction and lower depression and difficulties, for males but not females. Although, an inverse relationship between narrative coherence and well-being in early adolescence has been found for both males and females (McLean et al., 2010; Reese et al., 2015). Finally, in their cross-sectional study of adolescent New Zealanders, Reese and colleagues (2015) found no gender effects on the relationship between either causal or thematic coherence and depression, self esteem, or life satisfaction.

Overall, research indicates the relationship between narrative coherence and well-being may be stronger for males than females, but it is unclear whether increased narrative coherence is associated with an increase or decrease in well-being for male adolescents. This contrasts with the more consistent finding of a negative relationship between narrative coherence and well-being in early adolescence in studies using gender-combined samples (Chen et al., 2012; Reese et al., 2015). Research in adolescent populations has been limited however, and differences in research methodology and sample characteristics make it difficult to compare across studies. Furthermore, no research to date has directly examined the role of third variables, such as rumination, which may influence both the relationship between narrative coherence and well-being during adolescence and also gender differences in this relationship. Such research will contribute to our understanding of how and why gender affects the relationship between narrative coherence and well-being.

Current Study

The current study aimed to investigate the concurrent relationships among narrative coherence, rumination, psychological well-being, and gender in a mid-adolescent community sample. In particular, it sought to determine whether rumination mediates the relationship between narrative coherence and well-being during adolescence and whether there are any gender differences in the relationships among these variables.

Narrative coherence was operationalised as the two independent dimensions of causal and thematic coherence. Well-being was operationalised as the absence of psychopathology (depression) and the presence of psychological well-being (life satisfaction). The relationships between these two dimensions of well-being and the two dimensions of narrative coherence were examined separately.

The mid-adolescent sample (mean age = 16.31 years, SD = 8.48, range = 13 to 18 years) examined in the current study was slightly older than the early-adolescent samples in which a negative relationship between narrative coherence and well-being has been found. As it is unclear at what point in adolescence narrative coherence switches from being negatively associated with well-being to positively associated with it, hypotheses were based on findings in early-adolescent samples. The following hypotheses were made:

First, it was hypothesised that causal coherence would be inversely related to life satisfaction (McLean et al., 2010; Reese et al., 2015). Similarly, to the extent that thematic coherence represents an attempt at meaning making for which young adolescents have not adequately developed the requisite skills, it was also hypothesised that there would be a negative relationship between thematic coherence and life satisfaction. As only one study has directly investigated the relationship between depression and causal coherence, and depression and thematic coherence (Reese et al., 2015), examination of these relationships was exploratory in nature.

Second, rumination was expected to mediate the above-hypothesised negative relationships between causal and thematic coherence and wellbeing. Rumination was also expected to mediate the relationships between both causal and thematic coherence and depression, should a relationship between these variables be found.

Third, as females show higher levels of rumination in adolescence (Nolen-Hoeksema et al., 2008), it was expected that the above-hypothesised mediation relationships would be more salient for females than males.

Fourth, based on the outcomes of previous research, no gender effects were expected for levels of thematic coherence (Fivush, Bohanek, Zaman, & Grapin, 2012; Köber et al., 2015; Reese et al., 2014). Given the mixed results reported by previous research (e.g. Chen et al., 2012; Kober et al., 2015; Reese et al., 2015), examination of gender differences in adolescents' level of causal coherence, and also the relationship between narrative coherence and well-being in adolescence, was exploratory in nature.

Method

Participants

Participants were 190 students (107 females and 83 males) recruited from intermediate and secondary schools throughout Wellington, Nelson and Blenheim, New Zealand, as part of a wider longitudinal study. Participants ranged from 13 to 18 years of age (M age = 16.31 years, SD = 8.48) and were diverse in culture (New Zealand European = 48%; Maori = 10%, Pacific Islander = 17%; Asian = 5%, Other = 18%). As the Life Satisfaction scale was added after data collection for the wider study had started, a proportion of the sample did not complete this measure. Data were imputed for the missing Life Satisfaction scale items and other missing items (refer results section for details), so the final sample size remained at 190 participants.

Consent was obtained from principals for their school to participate in the study. Written consent was obtained from individuals over the age of 16 who were willing to participate. For individuals under 16 years, information on the study was sent to parents with children in the target age range at selected schools, and written consent for their child to participate was obtained. Participants were also provided verbal and written information about the study on the day of assessment. All participants were given a chocolate bar for their involvement in the study. Ethical approval was granted by the School of Psychology Ethics Committee under delegated authority of Victoria University of Wellington.

Procedure

Assessments were conducted in a classroom at participants' schools, in groups containing an average of twenty children. Participants were provided information about the study and advised their responses would remain confidential unless there were concerns about their safety. Signed consent forms were then collected from those who wished to participate before data collection commenced. Each student was assigned a unique identification number and issued a response booklet containing the battery of assessment measures for the wider study and the memory narrative instructions. Each assessment session lasted for approximately 45 minutes to an hour.

The researcher explained the study was concerned with children's memory for life events and the way youths think about themselves and their lives. The participants were first administered the CDI, Rumination and Life Satisfaction scales, in that order, as part of a broader suite of measures. All measures were provided in written form only. Participants were told to work through the booklet independently until they reached the page asking them to stop and wait for further instructions. Once all participants had completed the assessment

battery, they were asked to turn the page and read the instructions for the memory narrative exercise. The instructions were also read aloud by the researcher to facilitate the adolescents' understanding and successful completion of the task. Participants were told they would be given seven minutes to write down a memory for a turning point event in their life. After seven minutes, the participants were told to stop writing and response booklets were collected by the researcher. The study procedure was identical in all aspects for participants who completed the Life Satisfaction measure and those who didn't, with the exception that the Life Satisfaction group completed the additional Life Satisfaction measure prior to commencing the memory narrative task.

Measures

     Memory Narratives. Levels of narrative coherence were derived from adolescents' narratives for a turning point in their life, as these highly emotive, self-referential experiences are more likely to induce both attempts at meaning making via causal and thematic coherence, and rumination (Grysman & Hudson, 2010; Habermas & Köber, 2015; Nolen-Hoeksema et al., 2008; Thorne, McLean, & Lawrence, 2004). Furthermore, it was assessed that self-defining single event narratives, such as turning point narratives, would provide a more appropriate measure of narrative coherence during early- to mid-adolescence when the ability to construct an integrated life story is still in its infancy (Habermas & Bluck, 2000; Habermas & Köber, 2015; Köber et al., 2015; Pasupathi et al., 2007).

     A modified version of McAdams et al. (2006) guided autobiography was used to obtain participants' memory narratives. Participants were asked to provide a written narrative of a single episode that represented a turning point event in their life, defined as an event that has changed the individual's life or the kind of person they are. Participants were asked to describe what happened, when it happened, who was involved, what they were thinking and feeling, why the narrated experience is significant, and how it changed their life or them as a person. Participants were given seven minutes to write their narrative. All narratives were transcribed verbatim into a Microsoft Word document before coding.

     The total word count of each memory narrative was used to measure narrative length. Narratives were coded for causal coherence and thematic coherence. Two trained independent raters each coded a randomly selected subset of 83 (43%) of the memory narratives, yielding adequate inter-rater reliability for each variable (causal coherence $\kappa = .70$; thematic coherence $\kappa = .71$). Following reliability coding, any inter-rater disagreement on items was discussed and the discrepancy resolved. The study author then coded the remainder of the narratives.

Causal Coherence. Causal coherence was defined as the extent to which the narrative identified and elaborated on how the turning point had led to changes in the narrator's personality or to some kind of personal development (e.g. a new world view or life philosophy). Causal coherence was measured using a 4-point scale, ranging from 0 to 3, based on Reese and colleagues (2014; adapted from Habermas & de Silveira, 2008) coding scheme (refer Appendix A for scale point descriptions and examples).

Thematic Coherence. Thematic coherence was defined as the extent to which a coherent theme was developed, maintained, and resolved throughout the turning-point narrative. Thematic coherence was measured using a 4-point scale, ranging from 0 to 3, based on Reese and colleagues (2011; 2014) Narrative Coherence Coding Scheme (refer Appendix B for scale point descriptions and examples).

Rumination. The 10-item, short form of the Repetitive Thinking Questionnaire (RTQ) was used to measure rumination (McEvoy, Mahoney, & Moulds, 2010). The RTQ is a transdiagnostic measure of various forms of repetitive negative thinking, including depressive rumination, worry, and post-event processing (McEvoy et al., 2010). Depressive rumination is defined as a maladaptive form of repetitive thinking in which an individual passively reflects on the causes and consequences of their feelings or past events (Nolen-Hoeksema, 2000). Participants indicate how true a series of statements are with respect to the way they typically respond when feeling distressed or upset on a 5-point Likert scale, ranging from 1 (*not true at all*) to 5 (*very true*). Each statement describes a response style reflective of repetitive negative thinking, for example "*I have thoughts or images about all my shortcomings, failings, faults, mistakes*". The sum of participants' responses to the scale items is calculated for a maximum possible score of 50. Higher scores indicate an increased tendency for repetitive negative thinking. The RTQ-short form has good convergent validity and high internal consistency in a community sample (McEvoy et al., 2010). In the current study, the RTQ demonstrated high internal consistency ($\alpha = .92$).

Depression. The 12-item Children's Depression Inventory 2nd Edition - short form (CDI 2:SR[S]; Kovacs, 2010) was used to measure depression. The CDI 2:SR[S] is designed to determine the presence and severity of depressive symptoms in youths aged 7 to 17. Each item has three response options, scored 0, 1, or 2 according to the degree of symptom intensity they reflect, with item scores increasing as degree of intensity increases. Participants indicate which of three item response options best represents how they have been feeling in the previous 2 weeks, for example, 0 = *I do not feel alone*, 1 = *I feel alone many times*, or 2 = *I feel alone all the time*. Item scores are summed and higher scores indicate a higher level of

depressive symptoms, with a maximum score of 24. This scale has adequate internal consistency in community adolescent samples across cultures (Mezulis & Rudolph, 2012; Sun & Wang, 2015). In the current study the scale demonstrated adequate internal consistency (α = .81).

Life Satisfaction. Life satisfaction was measured using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). The SWLS consists of 5 items designed to measure an individual's subjective evaluation of their life (e.g. "*In most ways my life is close to my ideal*"; Pavot & Diener, 1993). Participants indicate the degree to which they agree with the item statement on a 7-point Likert scale, ranging from 1 (*Strongly Disagree*) to 7 (*Strongly Agree*). Item scores are summed to calculate an individual's total life satisfaction score. Higher scores indicate greater life satisfaction, with a maximum score of 35. The SWLS scale has achieved high internal reliability in community and clinical samples, across a diverse range of cultures and age groups (Neto, 1993; Pavot & Diener, 1993, 2008). In the current study the SWLS demonstrated adequate internal consistency (α = .88).

Results

Preliminary Analyses

Less than 1% of the sample was missing data for all measures with the exception of the life satisfaction measure, for which data were missing from 47% of the sample. One participant did not complete a single item on the Life Satisfaction scale and 90 participants were not administered the scale, due to it being added after their data had been collected.

Expectancy Maximisation (EM) imputation was used to impute missing data. The EM imputation was conducted using SPSS software, with 50 maximum iterations and all variables in the analysis model included in the imputation model. EM imputation provides unbiased parameters in that it preserves the means, standard deviations, variances, and covariances of the entire non-imputed data set (Graham, 2009; Schlomer, Bauman, & Card, 2010). The MCAR test for the missing data was significant, $\chi^2(285) = 375.62$, $p < .001$, indicating the data were not missing completely at random (Little, 1988). However, given almost half the sample were missing life satisfaction data only, EM imputation was considered less likely to bias the data than listwise deletion, which would exclude data from 47% of the sample (Graham, 2009). As such, imputed results are presented to minimise bias and maximise statistical power. An alpha level of 5% was used for all statistical tests in this study.

Differences Between Life Satisfaction and No Life Satisfaction Groups

To determine whether the addition of the Life Satisfaction measure influenced the subsequent memory narrative task, independent samples t-tests were used to compare mean

scores on the narrative coherence variables (causal coherence, thematic coherence) and memory length for participants who completed the life satisfaction measure and those who did not. An independent samples t-test was also used to investigate whether the participants who completed the life satisfaction measure differed in age from those who did not complete the measure.

There were no significant differences between groups in levels of causal coherence (LS Group: $M = 1.86$, $SD = 1.15$; NLS Group: $M = 2.12$, $SD = 1.08$), $t(188) = -1.62$, $p = .11$, thematic coherence (LS Group: $M = 2.42$, $SD = .57$; NLS Group: $M = 2.57$, $SD = .52$), $t(188) = -1.84$, $p = .07$, or age in months (LS Group: $M = 195.37$, $SD = 11.12$; NLS Group: $M = 196.16$, $SD = 3.86$), $t(188) = .639$, $p = .52$. There was a significant difference in the length (in words) of memory narratives between the two groups (LS Group: $M = 100.34$, $SD = 39.20$; NLS Group: $M = 140.90$, $SD = 47.10$), $t(188) = -6.47$, $p < .001$. Therefore the two groups were combined for all analyses and memory length was controlled for in subsequent analyses.

Chi-square tests of independence were used to examine whether there was a dependent relationship between participant group (those who completed the life satisfaction measure and those who did not) and gender. There was a marginally significant relationship between participant group and gender (LS Group: males = 50%, females = 50%; NLS Group: males = 37%, females = 63%), $\chi^2 (1) = 3.42$, $p = .06$, indicating marginally significant dependence between these two variables. Thus, to be conservative, gender was also controlled for in all subsequent analyses except those directly testing for gender effects.

Gender Differences in Well-being, Rumination, and Narrative Coherence Variables

Table 1

Participant and Memory Narrative Characteristics by Gender and Whole Sample

	Male		Female		Whole Sample	
	M	*SD*	*M*	*SD*	*M*	*SD*
Depression	5.69	4.02	7.13	3.85	6.50	3.98
Life Satisfaction	23.33	5.71	22.23	5.76	22.71	5.75
Rumination	28.70	7.77	32.95	9.81	31.09	9.20
Causal Coherence	1.84	1.10	2.09	1.13	1.98	1.12
Thematic Coherence	2.45	.59	2.52	.52	2.49	.55
Memory Length	103.49	38.82	132.01	50.09	119.55	47.56
Age	199.18	7.15	193.08	8.50	195.75	8.4

Note. N = 190. Males *n* = 83, Females *n* =107. Memory length = number of words. Age is in months.

Descriptive statistics for participant and memory narrative characteristics are presented in Table 1. On average, participants displayed relatively sophisticated use of both

causal and thematic coherence in their memory narratives. Participants displayed significantly higher levels of thematic coherence than causal coherence, $t(189) = 6.16$, $p < .001$. Independent samples t-tests were conducted to test the hypothesis that there would be no gender difference in participants' level of thematic coherence, and also to explore whether there were any gender differences in level of causal coherence, depression, rumination, or life satisfaction. As predicted, there were no gender differences in levels of thematic coherence, $t(188) = .96$, $p = .34$, or causal coherence, $t(188) = 1.53$, $p = .13$. Compared to males, females reported higher levels of depression, $t(188) = 2.51$, $p = .01$, and rumination, $t(188) = 3.23$, $p = .001$. No gender differences were found for levels of life satisfaction, $t(188) = -1.31$, $p = .19$.

Relationships Between Narrative Coherence and Well-Being

To test the first hypothesis, that there would be an inverse relationship between the narrative coherence variables and life satisfaction, and to examine the relationships between the narrative coherence variables (causal and thematic coherence) and depression, correlational analyses were conducted. As a preliminary test of the second hypothesis, that rumination would mediate the relationships between the narrative coherence (causal and thematic coherence) and well-being (life satisfaction and depression) variables, correlations between rumination and the narrative coherence and well-being variables were also conducted; this was done to investigate the presence of the direct relationships between these variables required for mediation (Jose, 2013). Correlational analyses for the whole sample and by gender are presented in Table 2. In addition to gender and memory length, age was also controlled for due to the differences in narrative coherence that have been found across the adolescent period (Köber et al., 2015; Reese et al., 2014; Reese et al., 2015).

Whole sample. Contrary to the first hypothesis that there would be either no relationship, or an inverse relationship, between the narrative coherence variables and life satisfaction, a significant positive relationship was found between life satisfaction and both causal and thematic coherence. This indicates that, as causal and thematic coherence increase, life satisfaction also increases. A significant negative relationship was found between depression and both causal and thematic coherence. These results indicate that as participants' level of causal and thematic coherence increase, their level of depression decreases.

As can be seen from Table 2, there was a significant positive relationship between rumination and depression and a significant negative relationship between rumination and life satisfaction. However, the direct relationship between rumination and thematic coherence was not significant. Similarly, the direct relationship between rumination and causal coherence was not significant at the $p < .05$ level of significance, but was significant at the $p < .10$ level

of significance. Thus, the correlation analyses indicated rumination did not meet the basic assumptions for mediation of the relationship between thematic coherence and either life satisfaction or depression, but did meet the basic assumptions for mediation of the relationship between causal coherence and both life satisfaction and depression at the $p < .10$ level of significance (Jose, 2013).

Table 2

Correlations Amongst Well-being, Rumination, and Narrative Coherence Variables for Whole Sample and by Gender

Variable	1	2	3	4	5
1. Depression					
Whole sample	-	-.72***	.59***	-.15*	-.15*
Females	-	-.69***	.54***	-.22*	-.20*
Males	-	-.76***	.68***	-.08	-.13
2. Life Satisfaction					
Whole sample		-	-.45***	.26***	.23**
Females		-	-.38***	.31**	.28**
Males		-	-.58***	.18	.18
3. Rumination					
Whole sample			-	-.14†	-.11
Females			-	-.12	-.14
Males			-	-.19†	-.13
4. Causal Coherence					
Whole sample				-	.18*
Females				-	.20*
Males				-	.08
5. Thematic coherence					
Whole sample					-
Females					-
Males					-

Note. $N = 190$. Males $n = 83$, Females $n = 107$. †$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$. Whole sample correlations are controlling for age, memory length, and gender. Correlations by gender are controlling for age and memory length.

Correlations by gender. Correlation analyses for female participants yielded the same pattern of results, and similar strength of relationships between variables, as those found for the whole sample. The only change was that the marginally significant negative relationship between rumination and causal coherence found for the whole sample failed to reach significance in the female only sample.

In contrast to the whole sample and female only sample, no significant relationships were found between the two narrative coherence and the two well-being variables in the male only sample. Although these relationships were in the same direction in all three samples, the strength of the relationships was weaker in the male only sample. The relationships between

rumination and all other variables yielded the same pattern of results, and similar strength of relationships, as those found in the whole sample. Thus, the correlation analyses by gender indicated the inter-variable relationships amongst narrative coherence (causal and thematic), rumination, and well-being (life satisfaction and depression) required for mediation were not present for either gender (Jose, 2013).

Rumination as a mediator of the relationship between narrative coherence and well-being

As the correlational analyses indicated the inter-relationships between rumination, thematic coherence, and both life satisfaction and depression that are required for mediation were not present, mediation analyses amongst these variables were unable to be conducted. Thus, the hypothesis that rumination would mediate the relationship between thematic coherence and both life satisfaction and depression, was not supported.

To further test the hypothesis that rumination would mediate the relationship between causal coherence and life satisfaction, and to explore whether rumination would mediate the unexpected relationship found between causal coherence and depression, a path model of these variables was constructed in AMOS. To control for their influence, age, gender and memory length were also included in the model as covariates. The significance of the indirect effect was tested using bootstrapping procedures to obtain the most accurate estimate of the indirect effect (Hayes, 2013). Standardized indirect effects were computed for each of 2,000 bootstrapped samples. Initially, a fully saturated model was analysed (refer Figure 1), after which non-significant paths were deleted sequentially leaving a model comprising only significant and covariance paths (Kline, 2011). This model fit the data well, χ^2 (1) = 1.52, p = .22, χ^2/df ratio = 1.52, NFI = 1.00, IFI = 1.00, CFI = 1.00, RMSEA = .05, Critical N = 479.

As presented in the model, when controlling for age, gender and memory narrative length, there was a significant positive relationship between causal coherence and life satisfaction and also a significant negative relationship between rumination and life satisfaction. The negative relationship between rumination and causal coherence was not significant at the $p < .05$ level, but was significant at the $p < .10$ level. Examination of the indirect effect indicated rumination was a significant mediator of the relationship between causal coherence and life satisfaction. Thus, results supported the hypothesis that rumination would mediate the relationship between causal coherence and life satisfaction.

As reported above, the negative relationship between causal coherence and rumination was not significant, however there was a significant positive relationship between rumination and depression. Although the direct effect of causal coherence on depression was not

significant, this is not required for mediation, as a non-significant direct effect may occur because tests of the direct effect have relatively low power compared to tests of the indirect effect (MacKinnon, 2008; Rucker, Preacher, Tormala, & Petty, 2011). Examination of the indirect effect indicated rumination was a significant mediator of the relationship between causal coherence and depression. Thus, results supported the hypothesis that rumination would mediate the relationship between causal coherence and depression.
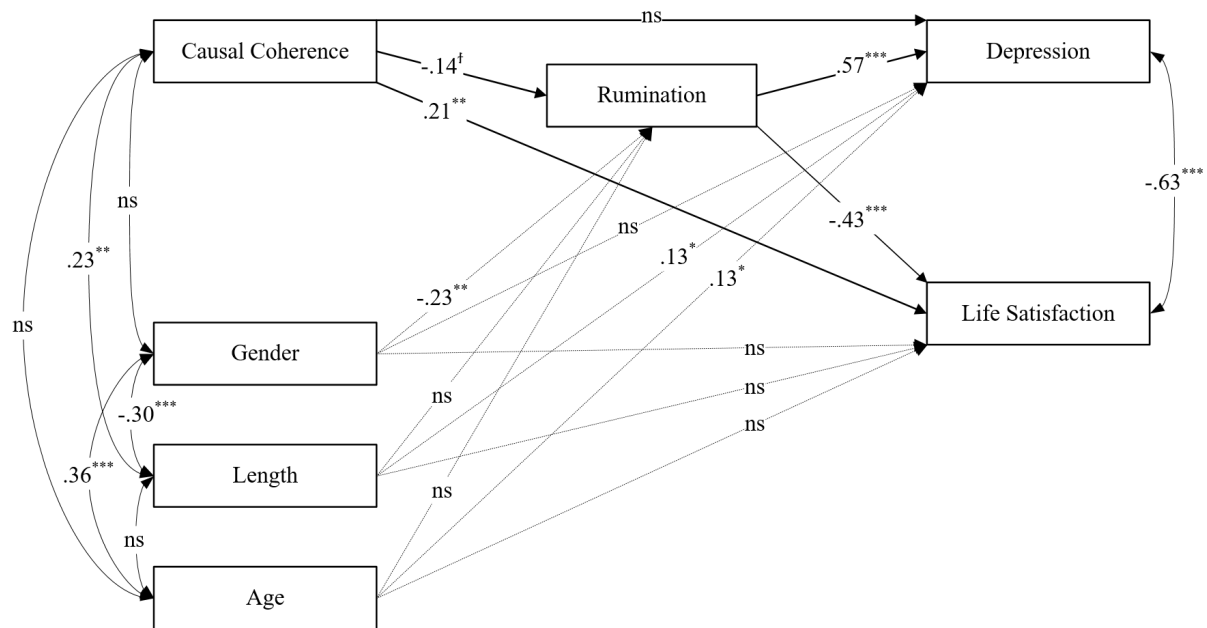
Figure 1. Structural equation model for concurrent relationships among causal coherence, rumination, life satisfaction and depression, controlling for age, gender, and length of memory narrative. Standardised path coefficients are displayed, with significance of the parameter estimates: $^\dagger p < .10$, $^* p < .05$, $^{**} p < .01$, $^{***} p < .001$, ns = not significant.

Due to the single time point design of the study, the mediation model presented in Figure 1 was also tested in reverse; that is with depression and life satisfaction predicting causal coherence and rumination mediating these relationships. As in the original model, age, gender, and memory length were entered as covariates in the model. The significance of the indirect effect was tested using bootstrapping procedures. Standardized indirect effects were computed for each of 2,000 bootstrapped samples. Initially, a fully saturated model was analysed, after which non-significant paths were deleted sequentially leaving a model comprising only significant and covariance paths (Kline, 2011). This model fit the data well, χ^2 (3) = 1.50, $p = .68$, χ^2/df ratio = .50, NFI = 1.00, IFI = 1.01, CFI = 1.00, RMSEA < .001, Critical N = 983, however only two pathways were significant. There was a positive relationship between life satisfaction and causal coherence ($\beta = .30$, $p < .01$), and a positive

relationship between rumination and depression ($\beta = .55$, $p < .001$). Neither causal coherence nor life satisfaction were significantly related to rumination, as such, the significant mediations found in the original model were not significant in the reverse model.

In summary, rumination did not mediate the relationship between thematic coherence and either life satisfaction or depression, but was a significant mediator of the relationship between causal coherence and both life satisfaction and depression. When the mediation model was tested in reverse, no significant mediations were found.

Gender Effects on the Relationships Among Narrative Coherence, Rumination and Well-being

In order to examine gender effects on the model fit, gender differences were tested by checking equality constraints between females and males for all variables in the original model. The overall unconstrained model for both groups fit the data well, $\chi^2 (2) = 4.15$, $p = .13$, χ^2/df ratio = 2.08, NFI = .99, IFI = .99, CFI = .99, RMSEA = .08, Critical N = 273. When analysed separately for each gender, however, rumination was not a significant mediator of either the relationship between causal coherence and life satisfaction, or causal coherence and depression, for either males or females. Rumination was a significant mediator of the relationships between causal coherence and both life satisfaction and depression at the $p < .10$ level for male participants only. These results do not support the hypothesis that rumination would be a stronger mediator of the relationship between narrative coherence and both well-being and psychopathology for females than males.

Examination of equality constraints for individual parameters revealed the rumination to life satisfaction regression was non-equivalent for males ($\beta = -.56$, $p < .001$) and females ($\beta = -.36$, $p < .001$), $\Delta\chi^2 (1) = 5.62$, $p = .02$. While the regression was significant for both genders, the negative relationship between rumination and life satisfaction was stronger for males than females. The rumination to depression regression was also non-equivalent for males ($\beta = .67$, $p < .001$) and females ($\beta = .52$, $p < .001$), $\Delta\chi^2 (1) = 7.63$, $p = .01$. Again, while the regression was significant for both genders, the relationship was stronger for males than females. One of the covariance loadings was also non-equivalent for males and females. The covariance between memory length and age was significant for females ($r(105) = .36$, $p < .001$) but not for males ($r(81) = -.08$, $p = .45$), $\Delta\chi^2 (1) = 11.90$, $p = .001$. Together, these results suggest the relationship between rumination and both life satisfaction and depression were stronger for males than females.

In summary, rumination was not a significant mediator of the relationship between causal coherence and either life satisfaction or depression for either gender, but there was a

trend toward rumination mediating these relationships for male participants only. This indicates a trend by which rumination explains more of the variance in the relationships between causal coherence and both life satisfaction and depression for males than females. Furthermore, rumination was a stronger concurrent predictor of both life satisfaction and depression for males than females.

Rumination as a moderator of the relationship between thematic coherence and well-being

Baron and Kenny (1986) suggest that if relationships between variables are weaker than expected, as was the case for the relationships among rumination and the narrative coherence variables, this may be due to heterogeneity in the sample. As both narrative coherence and rumination tend to increase across adolescence (Brown, 2003; Habermas & de Silveira, 2008), it may be that in the current study's mid-adolescent sample there was considerable heterogeneity in these variables. As such, the relationship between rumination, narrative coherence, and well-being (both depression and life satisfaction) may differ across levels of narrative coherence (both causal and thematic coherence) or rumination.

Table 3

Thematic Coherence as a Moderator of the Relationship between Rumination and both Life satisfaction and Depression

Predictor	Predicting Life Satisfaction				Predicting Depression			
	R^2	ΔR^2	β	p	R^2	ΔR^2	β	p
Step 1	.02	.02		.002	.08	.08		.36
Gender			.10	.25			-.18	.03
Age			-.07	.40			.13	.10
Length			-.08	.31			.16	.03
Step 2	.25	.23		<.001	.40	.32		.04
Gender			.01	.94			-.06	.38
Age			-.07	.34			.12	.05
Length			-.09	.22			.14	.03
Rumination			-.44	<.001			.57	<.001
TC			.19	.01			-.09	.15
Step 3	.27	.02		<.001	.41	.01		.01
Gender			.01	.88			-.06	.35
Age			-.08	.27			.13	.04
Length			-.05	.52			.11	.10
Rumination			-1.06	.001			1.02	<.001
TC			-.28	.24			.25	.24
TC*Rum			.75	.04			-.55	.10

Note. $N = 190$. Length = memory length in words. TC = thematic coherence. TC*Rum = thematic coherence x rumination.

A hierarchical multiple regression analysis (MRA) was conducted to examine whether rumination acted as a moderator of the relationships between the narrative coherence

variables and life satisfaction, or the relationships between the narrative coherence variables and depression. The moderation analyses were conducted using thematic coherence and causal coherence as the moderating variables, as this is mathematically equivalent to using rumination as the moderator variable (Dawson, 2014) but provided a more theoretically meaningful picture of the phenomena in question.

Thematic coherence, rumination, and life satisfaction. In testing whether thematic coherence moderated the relationship between rumination and life satisfaction (refer Table 3), gender, age, and memory length were entered as a covariate in the first step of the regression analyses and accounted for a non-significant 2% of the variance in life satisfaction. In the second step of the regression analyses, rumination and thematic coherence accounted for a significant 23% increase in the variance in life satisfaction. In the third step, the interaction term between thematic coherence and rumination explained a significant 2% increase in the variance in life satisfaction. Thus, thematic coherence was a significant moderator of the relationship between rumination and life satisfaction.
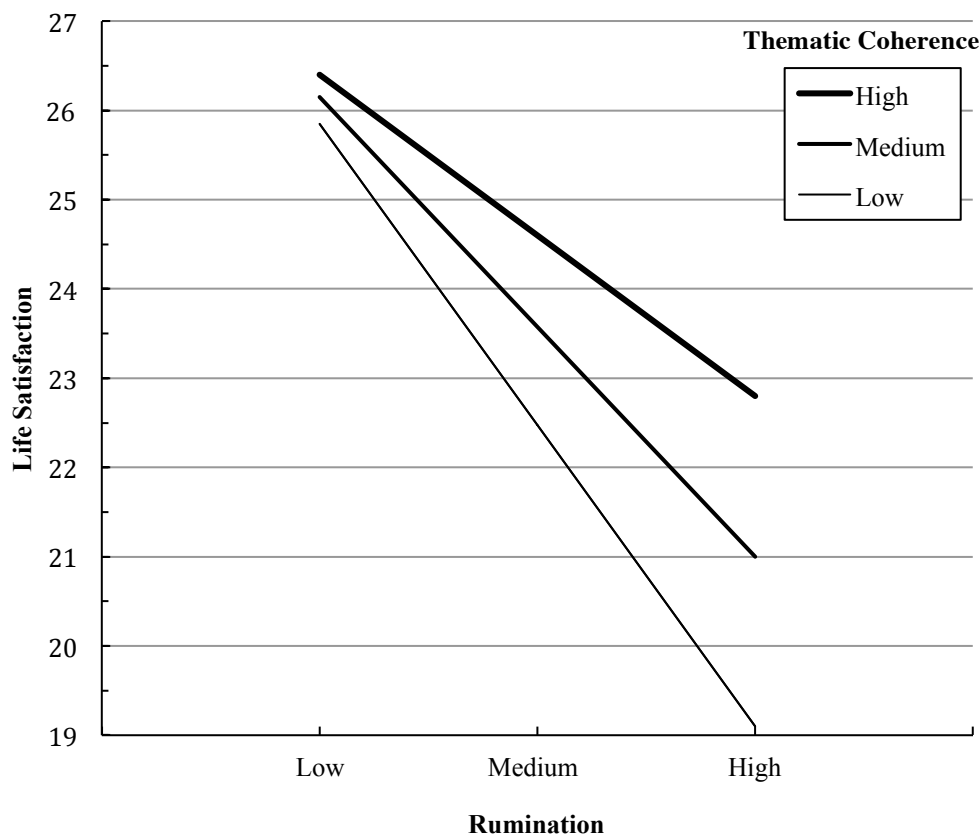

Figure 2. Thematic coherence as a moderator of the relationship between rumination and life satisfaction.

Simple slopes for the association between rumination and life satisfaction were tested for low (-1 *SD* below the mean), moderate (mean), and high (+1 *SD* above the mean) levels of thematic coherence (refer Figure 2). The simple slope tests revealed a significant negative association between rumination and life satisfaction at low (*b* = -.36, *SEb* = .08, *t*(187) = -4.60, *p* < .001), moderate (*b* = -.28, *SEb* = .07, *t*(187) = -3.77, *p* < .001), and high (*b* = -.19, *SEb* = .09, *t*(187) = -2.12, *p* = .04) levels of thematic coherence. The strength of the relationship between rumination and life satisfaction decreased with increasing levels of thematic coherence, suggesting thematic coherence buffers the negative relationship between rumination and life satisfaction.

When the sample was split by gender, the moderation effect failed to reach significance for either gender. Thus, there were no gender effects for thematic coherence as a moderator of the relationship between rumination and life satisfaction.

Thematic coherence, rumination, and depression. Next, the data were examined to determine whether thematic coherence moderated the relationship between rumination and depression (refer Table 3). Gender, age, and memory length were entered as covariates in the first step of the regression analysis and accounted for a significant 8% of the variance in depression. Rumination and thematic coherence were entered in the second step and accounted for a significant 32% increase in the variance in depression, but thematic coherence alone was not a significant predictor of depression at this step. In the third step, the interaction term between thematic coherence and rumination explained a non-significant 1% increase in the variance in depression, although the interaction term was a significant predictor of depression at the at the *p* < .10 level. As such, there was a trend toward thematic coherence acting as a moderator of the relationship between rumination and depression.

Simple slopes for the association between rumination and depression were tested for low (-1 *SD* below the mean), moderate (mean), and high (+1 *SD* above the mean) levels of thematic coherence (refer Figure 3). The simple slope tests revealed a significant positive association between rumination and depression for participants reporting low (*b* = .29, *SEb* = .04, *t*(187) = .7.77, *p* < .001), moderate (*b* = .25, *SEb* = .03, *t*(187) = 9.68, *p* < .001), and high (*b* = .20, *SEb* = .04, *t*(187) = 5.83, *p* < .001) levels of thematic coherence, but the strength of the relationship between rumination and depression decreased as the level of thematic coherence increased. Thus, there was a trend that thematic coherence buffered the positive relationship between rumination and depression.
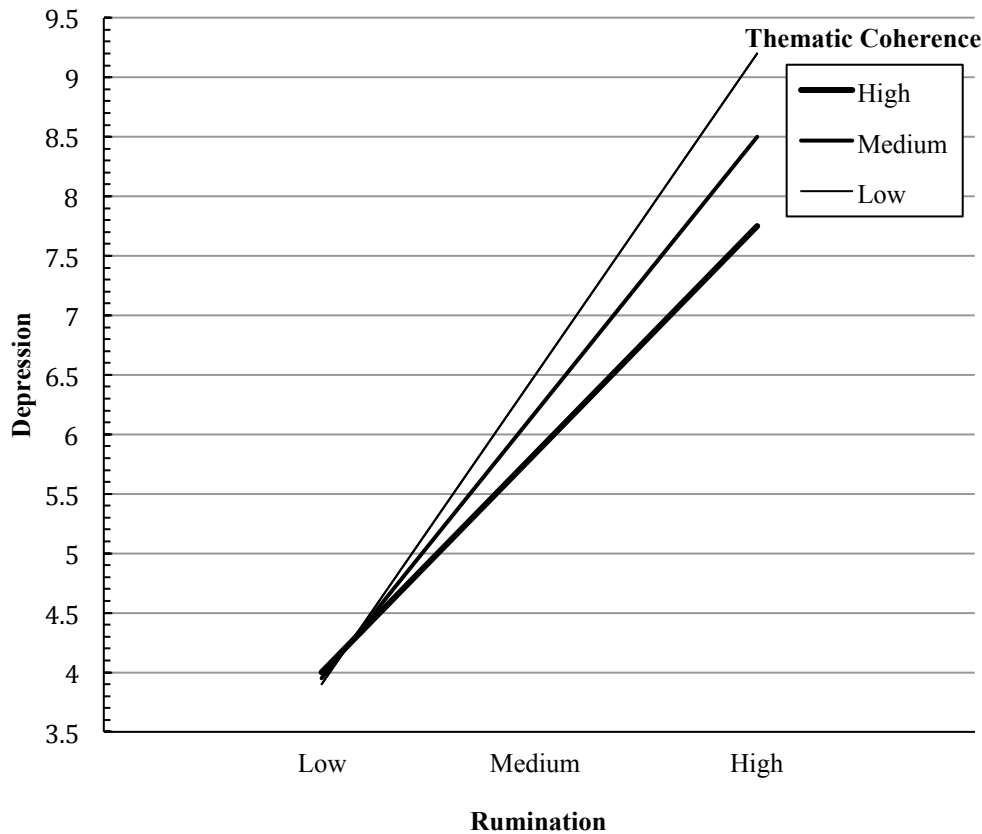
Figure 3. Thematic coherence as a moderator of the relationship between rumination and depression.

When the sample was split by gender, rumination was a significant moderator of the relationship between thematic coherence and depression for males only (refer Table 4). For males, age, and memory length were entered as covariates in the first step of the regression analysis and accounted for a non-significant 3% of the variance in depression. Rumination and thematic coherence were entered in the second step and accounted for a significant 45% increase in the variance in depression. In the third step, the interaction term between thematic coherence and rumination explained a significant 3% increase in the variance in depression.

Simple slopes for the association between rumination and depression in male participants were tested for low (-1 *SD* below the mean), moderate (mean), and high (+1 *SD* above the mean) levels of thematic coherence (refer Figure 4). The simple slope tests revealed a significant positive association between rumination and depression for male participants reporting low ($b = .42$, $SEb = .07$, $t(80) = 6.39$, $p < .001$), moderate ($b = .33$, $SEb = .07$, $t(80) = 5.01$, $p < .001$), and high ($b = .23$, $SEb = .09$, $t(80) = 2.54$, $p = .01$) levels of thematic coherence, but the strength of the relationship between rumination and depression decreased as the level of thematic coherence increased.

Table 4

Thematic Coherence as a Moderator of the Relationship between Rumination and Depression by Gender

Predictor	Males				Females			
	R^2	ΔR^2	β	p	R^2	ΔR^2	β	p
Step 1	.03	.03		.30	.07	.07		.02
Age			.04	.70			.20	.05
Length			.17	.13			.13	.21
Step 2	.48	.45		<.001	.35	.28		<.001
Age			.05	.58			.18	.03
Length			.09	.35			.12	.18
Rumination			.67	<.001			.50	<.001
TC			-.05	.63			-.12	.13
Step 3	.51	.03		<.001	.35	.001		.75
Age			.03	.70			.18	.04
Length			.05	.61			.12	.17
Rumination			1.41	<.001			.36	.44
TC			.64	.05			-.22	.49
TC*Rum			-.99	.03			.16	.75

Note. Predicting Depression. $N = 190$. Length = memory length in words. TC = thematic coherence. TC*Rum = thematic coherence x rumination.

The graph of the simple slopes indicates that, for male participants reporting low levels of rumination, there was a positive relationship between thematic coherence and depression. In contrast, for male participants reporting high levels of rumination, there was a negative relationship between thematic coherence and depression. Thus, thematic coherence exacerbated the positive relationship between rumination and depression for participants reporting low levels of rumination. In contrast, for participants reporting moderate to high levels of rumination, thematic coherence buffered the positive relationship between rumination and depression.

Causal coherence was not a significant moderator of the relationship between rumination and life satisfaction, or rumination and depression, either for the whole sample or for males or females separately.

In summary, thematic coherence was found to buffer the negative relationship between rumination and life satisfaction; there were no gender effects on this relationship. Thematic coherence was not a significant moderator of the relationship between rumination and depression for the whole sample, but was a significant moderator of this relationship for male participants only. Thematic coherence exacerbated the positive relationship between rumination and depression for males with a low tendency to ruminate, but buffered this relationship for males with a moderate to high tendency to ruminate. Causal coherence was

not a significant moderator of the relationship between rumination and life satisfaction, or rumination and depression, either for the whole sample or for males or females separately.
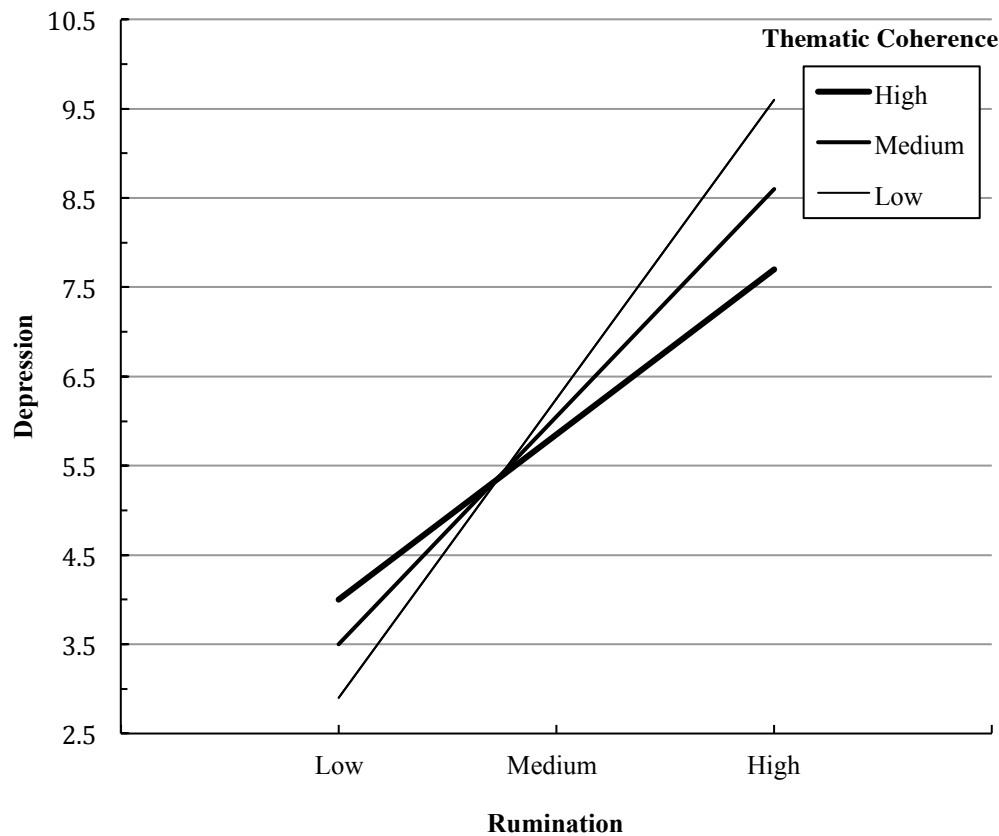
Figure 4. Thematic coherence as a moderator of the relationship between rumination and depression for male participants only.

Discussion

The current study aimed to examine the relationships among narrative coherence, rumination, and both well-being and psychopathology in a community sample of adolescents, as well as gender effects on these relationships. Drawing upon narrative theory and previous research, it was hypothesised that both causal and thematic coherence would be negatively related to well-being and that rumination would mediate this relationship. Examination of the relationships between both causal and thematic coherence and psychopathology was exploratory but, should these relationships be positive in direction, rumination was expected to mediate the relationships between the narrative coherence variables and psychopathology. While no gender differences were expected in levels of narrative coherence, it was hypothesised that rumination would be a stronger mediator of the relationship between the

narrative coherence variables and both well-being and psychopathology for females than males.

Relationships Among Narrative Coherence, Well-Being, and Gender

Whole sample. Contrary to the first hypothesis, both causal and thematic coherence were positively related to life satisfaction, and negatively related to depression in the whole sample. The fact that the current study's participants were predominantly in mid-adolescence (*M* age = 16.31 years) may explain why the relationships between the narrative coherence variables and both life satisfaction and depression were in the opposite direction to expectations. Previous studies that have found narrative coherence to be associated with decreased well-being or increased psychopathology have focused on individuals in early-adolescence, rather than mid-adolescence (Chen et al., 2012; McLean et al., 2010; Reese et al., 2015). The few studies that have examined the relationship between narrative coherence and well-being during mid-adolescence have found a non-significant relationship between narrative coherence and both well-being and psychopathology (Chen et al., 2012; McLean et al., 2010; Reese et al., 2015).

The current study is unusual in that the correlational relationships between causal and thematic coherence and both life satisfaction and depression were all found to be significant. The current study's sample size is at least double that of the studies reporting a non-significant relationship between narrative coherence and well-being or psychopathology. As such, the significant relationship found in the current study may largely be due to increased power. In addition, previous studies did not control for the possible confounding effects of age, gender, or memory length when examining correlations between narrative coherence and well-being or psychopathology. When these variables were removed as covariates in the current study, the correlations between the narrative coherence variables and both life satisfaction and depression remained significant, with the exception of the relationship between causal coherence and depression, which reduced to marginal-significance. As such, controlling for age, gender, and memory length did not appear to have a strong influence on the different results found between the current study and previous studies.

It is important to note that, in the current study, the relationships between the narrative coherence variables and both life satisfaction and depression were weak in strength; causal coherence accounted for 2% of the variance in depression and 7% of the variance in life satisfaction, whereas thematic coherence accounted for 2% of the variance in depression and 5% of the variance in life satisfaction. Thus, the relationship between narrative coherence and well-being was stronger than the relationship between narrative coherence and

psychopathology. The strength of the relationships found in the current study were similar to those reported by Reese and colleagues (2015) in a comparable population. Furthermore, Reese and colleagues (2015) also found a stronger relationship between narrative coherence and well-being than narrative coherence and psychopathology.

Previous research reported mixed results for the direction of the relationship between narrative coherence and well-being or psychopathology in mid-adolescence (Chen et al., 2012; McLean et al., 2010; Reese et al., 2015). Given both causal and thematic coherence skills are still developing across adolescence (Köber et al., 2015), there is likely to be large individual variation as to when in adolescence these skills start to consolidate and their relationship with well-being or psychopathology changes from positive to negative. This variation, together with the different definitions of mid-adolescence and well-being used across studies, may explain the inconsistent results found for the direction of the relationship between narrative coherence variables and both well-being and psychopathology in mid-adolescence. The results of the current study suggest that, by approximately 16 years of age, a positive relationship between narrative coherence and life satisfaction, and a negative relationship between narrative coherence and depression, has been established, albeit more robustly for females than for males. There is a need for longitudinal and experimental research examining changes in the relationship between narrative coherence and well-being, as well as the mechanisms underlying this change, to provide a better understanding of exactly when and why the nature of the relationship between narrative coherence and well-being changes across adolescence.

Relationships by gender. As hypothesised, and in line with previous research results (Chen et al., 2012; Habermas & de Silveira, 2008; Köber et al., 2015; McLean & Breen, 2009; Reese et al., 2014), no gender differences in levels of causal or thematic coherence were found. This result indicates males and females have equally developed narrative coherence skills by the time they reach mid-adolescence.

As for the whole sample, both causal and thematic coherence were positively related to life satisfaction, and a negatively related to depression in the female-only sample. For the male participants, the relationships between narrative coherence and both life satisfaction and depression were in the same direction as those found for the whole sample and female-only sample, although this pattern failed to reach significance. The male sample was smaller than the female sample, so the gender effects on the relationships between the narrative coherence and well-being variables may have been due to reduced power in the male sample.

Rumination as a Mediator of the Relationship Between Narrative Coherence and Well-being or Psychopathology

Causal coherence. The second hypothesis was that rumination would mediate the expected negative relationship between causal coherence and life satisfaction, and also the positive relationship between causal coherence and depression, should one be found. Rumination was found to mediate the positive relationship between causal coherence and life satisfaction, and the negative relationship between causal coherence and depression. Although hypothesised, these mediation relationships were unexpected, given the relationships between causal coherence and both life satisfaction and depression were in the opposite direction to predictions.

The finding that causal coherence was positively related to life satisfaction and negatively related to depression, together with the reasonably high mean levels of causal coherence displayed by the participants, suggests they were already relatively proficient at utilising causal coherence to draw meaning from life events. Therefore, their attempts at causal coherence may seldom lead to rumination and this may explain the weak nature of the mediation effects found in the current study. It is possible that rumination would have accounted for more variance in the relationships between narrative coherence and well-being or psychopathology if these relationships had been in the hypothesised direction, as may be the case earlier in adolescence. Similarly, the mediation effect may disappear or reduce in strength in later adolescence or early adulthood, as the positive relationship between causal coherence and well-being strengthens or consolidates (Baerger & McAdams, 1999; Reese et al., 2015; Waters & Fivush, 2014). Longitudinal or cross-sectional research examining the relationships among narrative coherence, rumination, and well-being or psychopathology across the duration of adolescence is needed to test these hypotheses.

The results of the current study suggest that, as causal coherence increases, rumination decreases, and this decrease in rumination partially explains the negative relationship between causal coherence and depression. Similarly, the decrease in rumination as causal coherence increases partially explains the positive relationship between causal coherence and life satisfaction. The participants displayed relatively high levels of causal coherence in their memory narratives, indicating the sample was relatively proficient and sophisticated in their use of causal coherence. Explained in terms of narrative theory, the participants may have been able to successfully utilise causal coherence to process the meaning of the narrated event for the self (Habermas & Bluck, 2000; Köber et al., 2015; McAdams, 2001). This process may help them to move past repetitive thinking about the causes and consequences of the

event (i.e. rumination), and allow them to integrate the event into their self-concept, thereby increasing well-being and decreasing psychopathology (Habermas, 2011; McAdams, 2006). Although this study did not directly test these processes, the vast majority of the participants' indicated their narrated life event had a positive impact on their personality or led to positive personal development (i.e. positively-valenced causal coherence). This finding suggests participants were able to identify positive meaning for the self, even from negative events, which is more suggestive of active problem-solving than rumination, and may explain why increased causal coherence might lead to decreased rumination.

As the results are based on single time-point data, it is possible the relationship between causal coherence, rumination, and both well-being and psychopathology work in the reverse direction, i.e. with changes in life satisfaction or depression influencing levels of rumination, which, in turn, influence levels of causal coherence. When the mediation was run in reverse, results did not provide support for the reverse model. However, longitudinal data or tests of other alternative pathways in the mediation model by which the variables in question could be influencing each other would be necessary before definitive claims about the direction and causal nature of the relationships can be made (Iacobucci, 2008).

Thematic coherence. As for causal coherence, it was hypothesised that rumination would mediate the expected negative relationship between thematic coherence and life satisfaction, and also the positive relationship between thematic coherence and depression, should one be found. Contrary to prediction, rumination was not a significant mediator of the positive relationship between thematic coherence and life satisfaction, or the negative relationship between thematic coherence and depression.

It is unclear why rumination mediated the relationships between causal coherence and both depression and life satisfaction, but not the relationships between thematic coherence and the outcome variables. Causal and thematic coherence were only weakly related and these differing relationships with rumination, life satisfaction, and depression provide further evidence for the independence of these two dimensions of narrative coherence (Reese et al., 2011). Both causal coherence and rumination are more directly self-referential in nature than thematic coherence. Although theorised to play a role in identity formation (Köber et al., 2015; McAdams, 2001), in the context of single-event memory narratives, thematic coherence does not require participants to make explicit links between an event and the self. It may be that the shared explicitly self-referential nature of causal coherence and rumination mean the shared variance between these variables is higher than that for rumination and thematic coherence. As such, rumination may exert a stronger influence on the relationships between

causal coherence and well-being or psychopathology, than the relationships between thematic coherence and these two variables. Indeed, the correlation between rumination and causal coherence was stronger than that between rumination and thematic coherence in the current study, albeit by a small margin.

Another reason rumination may mediate the relationships between causal, but not thematic, coherence and both life satisfaction and psychopathology is that participants scored significantly lower on causal coherence than thematic coherence. This result indicates participants were less proficient in the skill of causal coherence than thematic coherence. Although generally able to utilise causal coherence to successfully draw meaning from events, participants may still have been more prone to falling into rumination when attempting to use causal coherence for this process than when attempting to use thematic coherence. Thus, rumination would be a stronger mediator of the relationships between causal coherence and the well-being variables, than thematic coherence and the well-being variables.

Gender effects. Gender differences in the relationships between narrative coherence, rumination, and both well-being and psychopathology have not been studied previously. However, based on research and theory on the differences in socialisation of emotion regulation in males and females (Fivush et al., 2000; Grysman & Hudson, 2013), it was hypothesised that rumination would be a stronger mediator of the relationships between narrative coherence and both well-being and psychopathology for females than males. The results of the current study do not support this hypothesis. When analysed separately for male and female participants, rumination was not a significant mediator of the relationships between causal or thematic coherence and life satisfaction, or causal or thematic coherence and depression, for either gender. However, for male participants only, rumination was a significant mediator of the relationships between causal coherence and both life satisfaction and depression at the $p < .10$ level of significance. Thus, rumination was a stronger mediator of the relationships between causal coherence and both life satisfaction and depression for males than females.

The current study's unexpected finding may be due to the relationships between causal coherence and both life satisfaction and depression being in the opposite direction to predictions. As mentioned above, for those proficient in utilising causal coherence to draw meaning from life events, causal coherence may lead to decreased rumination, which in turn may lead to increased life satisfaction and decreased depression. As mothers talk more about the causes and consequences of negative events with sons than with daughters (Fivush, 1989; Fivush et al., 2000; Grysman & Hudson, 2013), males may be more experienced than females

in the causal motivational reasoning that underlies causal coherence. Thus, increased causal coherence may be more likely to lead to reductions in rumination in males than females, particularly as females are more prone to rumination than males. Consequently, rumination would be a stronger mediator of the relationships between causal coherence and both life satisfaction and depression for males than females. The negative relationship between causal coherence and rumination was stronger for males than females in the current study, providing tentative support for this theory.

Narrative Coherence as a Moderator of the Relationship Between Rumination and Both Life Satisfaction and Depression

Whole sample. Rather than rumination acting as a mediator of the relationship between thematic coherence and either well-being or psychopathology, thematic coherence was found to moderate the relationship between rumination and life satisfaction. Although there was a significant negative relationship between rumination and life satisfaction regardless of the extent to which participants displayed thematic coherence in their memory narratives, the strength of the negative relationship between rumination and life satisfaction decreased as thematic coherence increased. In other words, thematic coherence buffered the negative relationship between rumination and life satisfaction.

It should be noted that the moderation effect was small in size, with the interaction between rumination and thematic coherence explaining only an additional 2% increase in the variance in life satisfaction over and above the main effects of rumination, thematic coherence, age, gender and memory length. However, given the strength of the relationship between rumination and life satisfaction, even a small moderation effect of thematic coherence on this relationship is of interest.

Thematic coherence was not a significant moderator of the relationship between rumination and depression at the $p < .05$ level, although it was a significant moderator of this relationship at the $p < .10$ level of significance. The strength of the positive relationship between rumination and depression decreased as thematic coherence increased, indicating a trend by which thematic coherence buffered the positive relationship between rumination and depression. It is possible that the moderating effect of thematic coherence on the relationship between rumination and depression was weakened by the strength of the positive relationship between rumination and depression. This may be why thematic coherence was not a significant moderator of the relationship between rumination and depression, but did moderate the relationship between rumination and life satisfaction, which, although strong, was not as strong as the relationship between rumination and depression. Rumination was not

a significant moderator of the relationship between causal coherence and life satisfaction, or causal coherence and depression.

To achieve the highest score for thematic coherence in the current study, participants were required to display not only the ability to develop and maintain a theme, but also the ability to provide an explicit or implicit resolution to the theme or issue raised in their memory narrative. In contrast, achieving the highest score for causal coherence only required the participant to increase the degree of elaboration with which they described how the narrated event had impacted on their personality or world-view. As such, a high score for causal coherence required participants to display increased proficiency in one broad skill area (understanding and describing the impact of life events on the self), whereas a high score on thematic coherence required participants to display ability in an additional skill, over and above that required to achieve the lower level scores for thematic coherence (the ability to maintain and develop a theme as well as an ability for emotional problem-solving). The requirement to display additional skills to achieve the highest levels of thematic coherence, but not causal coherence, may explain why the relationship between rumination and life satisfaction changed across levels of thematic coherence but not causal coherence. In other words, this may explain why thematic coherence, but not causal coherence, moderated the relationship between rumination and life satisfaction.

The role of thematic coherence in moderating the relationships between rumination and well-being or psychopathology has not previous been examined. As such, the mechanisms underlying these relationships are unknown. Thematic coherence may represent a deliberate self-reflective process, in which individuals analyse how an important event relates to other autobiographical experiences or their emotions, in an attempt to resolve an issue raised by the event, regulate the emotions aroused by the event, and ultimately integrate the event into their sense of self. In this sense, thematic coherence may represent the process of reflective rumination or self-reflection. Reflective rumination is defined as neutrally-valenced, purposeful contemplation of life events in an effort to problem solve and alleviate negative affect (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). Reflective rumination is considered an adaptive form of rumination, as it does not encompass the passive, abstract, and negative or self-critical characteristics of depressive rumination (Trapnell, 1999; Treynor et al., 2003).

In contrast to the positive relationship found between depression and the maladaptive form of rumination measured in the current study, reflective rumination is negatively related to depression concurrently (Takano & Tanno, 2009) and predicts decreased depression over

time (Treynor et al., 2003). Reflective rumination has also been found to be positively related to adaptive coping strategies (Burwell & Shirk, 2007) and life satisfaction (Boyraz & Kuhl, 2015). The pattern of relationships between reflective rumination and both depression and well-being is similar to that found between thematic coherence and both life satisfaction and depression in the current study. Just as theory and previous research suggests the negative relationship between narrative coherence and well-being found in early adolescents may be mediated by depressive or maladaptive rumination (Chen et al., 2012; Reese et al., 2015), it is possible that reflective rumination may mediate the positive relationship between narrative coherence and life satisfaction, or the negative relationship between narrative coherence and depression, found in mid-late adolescence. To test this hypothesis, future research should examine the longitudinal relationships among reflective rumination, narrative coherence, and both well-being and psychopathology in mid- to late-adolescence.

The moderating effect of thematic coherence on the relationships between rumination and both life satisfaction and depression may also represent increased verbal or executive functioning in individuals who display high levels of thematic coherence. Thematic coherence was positively correlated with memory length in the current study, suggesting thematic coherence may, in part, reflect improved verbal skills. Although memory length was controlled for in all analyses conducted, there may be other verbal and executive functions that explain thematic coherence's relationships with life satisfaction and depression, as well as its moderating effect on the relationships between these variables and rumination.

Although the social-cognitive skills underpinning the dimensions of narrative coherence have been studied (Habermas & Bluck, 2000), research has not yet directly examined the executive functions that underpin thematic coherence. It is likely that various executive control skills are required for the process of developing, maintaining, and resolving a coherent theme throughout a memory narrative, however. For example, thematic coherence requires individuals to inhibit theme-irrelevant information, search memory for connections to other theme-relevant autobiographical experiences and organise these coherently into the narrative, and also to manage their emotional response to the memory in order to stay on-task and maintain the goal of producing a thematically-coherent memory narrative. It is therefore likely that individuals who display high levels of thematic coherence have stronger executive control skills than those who display low levels of thematic coherence in their memory narrative. Indeed, research with individuals with schizophrenia found that reduced mental flexibility (as measured by the Trail Making Test; Reitan, 1955) was associated with reduced thematic coherence (Allé et al., 2015). Future research should explore the relationship

between thematic coherence and various measures of verbal and executive function skills, such as verbal fluency, mental flexibility, and effortful control.

Both depressive rumination and depression have been found to impair a wide variety of executive functions, including the disengagement of attention form negative stimuli (Joormann, Yoon, & Zetsche, 2007; Koster, De Lissnyder, Derakshan, & De Raedt, 2011), mental flexibility (Connolly et al., 2014; De Lissnyder, Koster, Derakshan, & De Raedt, 2010; Joormann, Levens, & Gotlib, 2011; Whitmer & Gotlib, 2012), and inhibition of irrelevant information in attention or memory tasks (De Lissnyder, Derakshan, De Raedt, & Koster, 2011; Fawcett et al., 2015; Joormann et al., 2007; Whitmer & Gotlib, 2012). Thus, improved executive control skills may help individuals to disengage from maladaptive rumination and move toward active problem-solving, thereby decreasing psychopathology and increasing well-being (Joormann, 2010). Future research should examine whether measures of executive control, such as verbal fluency (Delis, Kramer, Kaplan, & Holdnack, 2004) or effortful control (Ellis & Rothbart, 2001), mediate the relationship between thematic coherence and well-being or psychopathology. It is also possible that effortful control may buffer the maladaptive aspects of rumination, such that, for those individuals high on effortful control, rumination has a weaker positive association with depression or negative association with life satisfaction. Future research could explore whether controlling for executive control, weakens the moderation effect of thematic coherence on the relationships between rumination and both life satisfaction and depression.

Gender effects. When analysed separately by gender, rumination was not a significant moderator of the relationship between causal coherence and life satisfaction, or causal coherence and depression for either males or females. Similarly, thematic coherence was not a significant moderator of the relationship between rumination and life satisfaction for either male or female participants alone. In contrast, when analyses were conducted separately by gender, thematic coherence was a significant moderator of the relationship between rumination and depression for males but not for females.

The significant moderation relationship found for male participants but not female participants may be because rumination is less common amongst males than females (Jose & Brown, 2008; Nolen-Hoeksema et al., 2008). For females, a certain amount of rumination may be a normative or relatively automatic process and rumination may not always represent an active attempt to draw meaning from or resolve difficult events. As such, rumination would be less likely to lead to distress, and the reflective, meaning making process characteristic of thematic coherence may have less impact on the relationship between

rumination and depression for females than males. In contrast, when males ruminate, this may represent a more deliberate attempt to regulate difficult emotions. However, as males are less experienced ruminators than females, rumination may be more likely to lead to distress for males than females. Indeed, in the current study, the relationship between rumination and depression was stronger for males than females. Thus, the reflective, meaning making process of thematic coherence may have more impact on the relationship between rumination and depression for males, as rumination in males may be more representative of a need to resolve and integrate a difficult experience to avoid distress.

In the current study, thematic coherence exacerbated the negative relationship between rumination and depression for males with a low tendency to ruminate, but buffered this relationship for males with a high tendency to ruminate. One explanation for this finding is that males with a low tendency to ruminate don't often attempt to analyse or derive meaning from events, and have therefore had less practice in utilising the reflective process involved in thematic coherence. Thus, for these individuals, increased thematic coherence may inadvertently enhance rumination and lead to increased depression. In contrast, males with a moderate to high tendency to ruminate may be proficient in the use of thematic coherence to derive meaning from life experiences, such that increased thematic coherence aids in problem-solving and serves to decrease depression. A longitudinal examination of the causal relationships between rumination, thematic coherence, and depression in male adolescences would help to better understand the processes at play between these variables.

In addition to the suggestions for future research outlined above, it would be useful to explore the effects of memory event valence and causal coherence valence on the relationships between narrative coherence, rumination, and both well-being and psychopathology. Research suggests narrative coherence is more often displayed in narratives about negative life experiences than neutral or positive experiences, and the relationship between narrative coherence and well-being has been found to be stronger in the context of narratives about negative life experiences (McAdams, 2008; McLean, Pasupathi, & Pals, 2007; McLean & Pratt, 2006). This is thought to occur because, in comparison to positive experiences, there is a greater drive to explain or obtain a sense of meaning from life's negative experiences in order to resolve the emotions they arouse (McAdams, 2008; Pals, 2006; Park, 2010).

Banks and Salmon (2013) found that a higher level of causal coherence, defined as the frequency and degree of elaboration of self-event connections, was associated with higher levels of psychopathology for individuals who tended to view life events as having caused

negative changes in the self (i.e. negatively-valenced causal coherence). In contrast, a greater tendency to view negative life events as having caused positive changes in the self (positively-valenced causal coherence) was associated with an increase in psychological well-being, even when negative events were viewed as central to the self (Banks & Salmon, 2013). Thus, the valence of the event narrated by participants, as well as the valence of the causal coherence they display, may influence the relationships found among narrative coherence, rumination, and well-being.

The effects of causal coherence valence and event valence were unable to examined in the current study, as the proportion of participants who either displayed negatively-valenced causal coherence ($n = 17$, 9%), or focused on positive events (n = 64, 34%), in their memory narratives was too low. Future research should explore whether the relationship between narrative coherence and well-being or psychopathology is stronger in the context of narratives about negative life events than positive life events. Similarly, it is possible that the positive relationship found between narrative coherence and life satisfaction, and the negative relationship found between narrative coherence and depression, in the current study may be reversed in the context of negatively-valenced causal coherence. Rumination might also be a stronger mediator of the relationship between causal coherence and well-being or psychopathology for participants who display negatively-valenced casual coherence, or in the context of negative events for individuals in early adolescence.

Strengths and Limitations

A notable limitation of the current study is that it is correlational rather than longitudinal in nature. It was therefore not possible to establish causality in the relationships between narrative coherence, rumination, and wellbeing or psychopathology. With regard to the significant mediation models found in the current study, it was not possible to determine the direction of the pathway by which rumination mediates the relationship between life satisfaction and causal coherence, or depression and causal coherence. The limited age-range of the current study also meant it was not possible to explore how the relationships among narrative coherence, rumination, and both well-being and psychopathology change across adolescence. As previously mentioned, there is a need for longitudinal research examining the relationships between narrative coherence and both well-being and psychopathology across adolescence, as well as factors that may influence these relationships.

Due to the single time-point design of the study, it was not possible to control for prior levels of depression or life satisfaction in the current study. As such, the strong relationships found between rumination and both depression and life satisfaction may have increased the

likelihood of finding significant relationships between the variables studied. The pattern of results does not support this explanation however, as the relationship between rumination and life satisfaction was weaker than that found between rumination and depression, and yet the mediation and moderation effects were stronger for relationships among narrative coherence, rumination, and life satisfaction, as opposed to depression.

A further limitation of the current study was the addition of the life satisfaction measure after data collection had started, which meant that life satisfaction data was imputed for 47% of the participants. It is important to note that, other than life satisfaction data, the percentage of missing data for all other variables was below 1% of the sample. In addition, the moderate to strong correlations between life satisfaction and all other key variables (depression, rumination, and both narrative coherence variables), and the reasonably large sample of participants that did complete the life satisfaction measure ($n = 100$), meant that there was a large amount of data on which to base the imputation calculation. These factors would have improved the validity of the imputed data. Furthermore, it is widely recognised that imputation leads to less biased data, and more power, than listwise deletion (Graham, 2009), particularly as 47% of the data would have been deleted had listwise deletion occurred.

Despite these limitations, this study has several strengths. It is the first study to explore the relationships among narrative coherence, rumination, and both wellbeing and psychopathology in any age group, and the first to explore factors associated with the relationship between narrative coherence and well-being during adolescence. This study also contributed to the extremely limited research base examining the relationships among narrative coherence and both well-being and psychopathology during mid-adolescence, as well as gender effects on the relationships among these variables. Although this correlational study could not establish causality amongst variables, exploring factors associated with the relationship between narrative coherence and both well-being and psychopathology is the first step in determining the mechanisms that might explain the changing relationships between these variables across adolescence. Furthermore, the size and cultural diversity of the sample suggests there is a strong likelihood the current study's results will generalise to the wider population.

Implications and Summary

The results of the current study provide indirect support for the theory that rumination mediates the negative relationship between narrative coherence and well-being found in early adolescence. By mid-adolescence however, people are proficient in utilising thematic coherence and, to a slightly lesser-extent, causal coherence, to draw meaning from their life

experiences and regulate the emotions they arouse. Furthermore, at this age, increasing individual's thematic coherence skills may serve to counter the negative effect of rumination on their well-being. Thematic coherence appears to be more beneficial for individuals with a high tendency to ruminate, than those with a low tendency to ruminate however, particularly for males. Longitudinal and experimental research investigating the mechanisms underlying thematic coherence skills, as well as their impact on the link between rumination and well-being throughout adolescence, is needed. This research would contribute to a better understanding of when increased thematic coherence is helpful and when it might negatively impact on adolescents' psychological functioning.

This study has filled a gap in the literature by examining the relationships among narrative coherence, rumination, and both well-being and psychopathology in a mid-adolescent community sample. In so doing, it has contributed to the knowledge base on the inter-relationships between these variables. It has also highlighted important areas for future research to further enhance our understanding of the unique ways in which causal and thematic coherence function to influence adolescents' psychological functioning.

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Appendix A

Table A1

Coding for Causal Coherence in Turning Point Narratives

Causal Coherence	*Definition*	*Example*
0 points	The narrative did not provide any reference to personality change or the realisation of personal development.	**Starting NCEA.** *Starting NCEA. This year. Because I have to make sure I get all the credits so that I can pass. If I don't pass then I will have to do it again.*
1 point	The narrative merely implied but did not state a change in personality or personal development.	**Grandparents arguing.** *There was this one point it did change me a bit and that's when my grandparents argue. It does happen, just not often. It has happened a couple of times and every time it happens it either changes me as a person or it's a turning point for me.*
2 points	The narrative explicitly states changes in personality or a personal development but does not detail those changes.	**Starting college.** *Moving to New Zealand with my family, I felt sad for leaving my country and friends, but I'm glad That I am in New Zealand now I made new friends who are really kind. This has changed me because it taught how to meet new people and gave me confidence.*
3 points	The narrative explicitly describes the changes in personality or personal development as a result of the event.	**First love**. *At the age of 6-7 my mum had another baby and she died a few hours after birth. The next few weeks after that I was tormented as it felt like my fault. It took years to realise it was up to me to live a life that my sister would be proud to have lived. And I felt like it was my duty to make a positive change to everyone's life that I am a part of. I now know death isn't the worst thing in life, it is living a life that has no positive effect on someone else's. This has become my direction in life.*

Note. Adapted from "Living to tell the tale: Adolescent narrative identity, traits, and well-being across cultures," by E. Reese, H. M. McAnally, Q. Wang, and Y. Chen, 2015, Manuscript under review.

Appendix B

Table A2

Coding for Thematic Coherence in Turning Point Narratives

Thematic Coherence	Definition	Example
0 points	The narrative is mostly off-topic and never states a theme.	**School.** *School and stuff....just myself, things changed and now its different.*
1 point	The narrative has an identifiable topic but the theme is not developed.	**Leaving Home.** *When I first left home to go to boarding it changed who I was and gave me the feeling of leaving home.*
2 points	The narrative contains a clear theme, which is elaborated to some degree, but there is no resolution.	**Parent's separation.** *When my parents split. I slowly knew it was coming with all the yelling and screaming but what got to me more was having to decide who do I love more than the other one? Who do I stay with? Will my parents move away? This changed my life as I barely stay with my dad anymore and relationships don't last forever.*
3 points	The theme is substantially developed, contains emotions or links to other autobiographical experiences, and is resolved in some way.	**Cousin's wedding.** *The first time my father went overseas was a turning point for me. It made me realise just how important family is. I come from a very big family and sometimes you take each for granted; he only went for a visit in 2012 or something but it was still a really sad, scary moment. I was so glad and blessed to have my older brother with me because he filled in when my Dad was gone and now my older brother is in Australia but he's still very involved. Even though my dad was only gone for a month, it still made me realise how important family is. I'm older now so it's not as sad as it was at the time.*

Note. Adapted from "Living to tell the tale: Adolescent narrative identity, traits, and well-being across cultures," by E. Reese, H. M. McAnally, Q. Wang, and Y. Chen, 2015, Manuscript under review.