

The Narrative of Mental Health:
The Relationship Between Narrators and Narrative Content
as a Basis for Emotional Dispositions

by

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Abstract

In an effort to elucidate the relationship between narrative and emotion, a new narrative concept (Narrative Reference Frames) was derived from the *spatial reference frame* construct used in spatial cognition research. Connections were drawn between egocentric, allocentric and counterfactual reference frames, and descriptive, evaluative and prescriptive linguistic modes, respectively. The validity of the Narrative Reference Frame model was investigated using intercoder reliability, and the relationship between Narrative Reference Frames and emotion was examined through correlation and mediation analyses. Intercoder reliability on n=2296 Narrative Reference Frame judgements suggested a moderate level of agreement. Significant associations were revealed between a subsample of substantially reliable judgements, emotion, and personality. The potential utility of the Narrative Reference Frame model in the diagnosis and treatment of emotional disorders is discussed.

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Chapter 1: Introduction

A narrative may be best understood as an account of behavioural events that is imbued with causality, human time¹, and meaning (Bruner, 1991). Essentially, a narrative is a story – indeed, the terms *story* and *narrative* are used interchangeably at times in the literature of narrative psychology. However, whereas the term story often connotes a specific structure with an introduction, conflict, and resolution, many of the linguistic accounts that narrative psychologists and lay folk treat as narratives do not have such a definitive structure. I have chosen to borrow Bruner's account of narrative precisely because it is inclusive of the spectrum of narrative phenomena, including paradigmatic story-like accounts.

Narrative is a cognitive tool fit for integrating information into coherent and connected structures (Laszlo, 2008). These structures organize the chaotic flow of information that we are confronted with as information processing agents, thereby freeing up cognitive resources to enable deeper processing (Robinson & Hawpe 1986). For instance, rather than processing experiential information haphazardly, the human brain seems to encode and retrieve episodic memories in narrative chunks, as suggested by fMRI research (Ezzyat & Davachi, 2011). Likewise, in familiar situations, cognitive load is decreased by organizing real time experiences as well as expectations according scripts which are narrative in structure (Dewhurst, Holmes, & Swannell, 2008; Schank & Abelson, 1977).

These examples highlight a central feature of narrative – namely, its aptness for framing experiences. It is precisely this feature which secures narrative's place as the fundamental mode by which humans communicate and connect experiences (Laszlo, 2008; McAdams, Josselson, & Lieblich, 2006). The framing quality of narrative also makes narratives an ideal means for manipulating emotions. This is because framing has a direct effect on emotional processing, as demonstrated by the body of support for appraisal theories of emotion (cf. Scherer, Schorr & Johnstone, 2001). For example, it has been found that deliberately framing events in terms of negative details produces negative emotions

¹ *Human time* refers to one's temporal framing of an event derived from the meaning of said event (Ricoeur, 1990)

(Ochsner et al., 2004), abstracting away from valence laden details produces neutral emotions (Gross, 1998), and deliberately framing events in terms of positive details produces positive emotions (Folkman & Moskowitz, 2000).

Because narrative is a fundamental information-organizing tool that can directly influence emotions, tasks that manipulate narrative can be employed to regulate emotions and treat emotional disorders. The use of narrative as a means to manipulate emotions is an ancient idea. Since its inception, Buddhism has employed practices that disengage automatic narrative generation in order to foster emotional control (Arch & Craske, 2006). Likewise, the Stoic philosophers of ancient Greece deliberately produced impersonal narratives in an effort to attain and maintain emotional control (Nussbaum, 1987). Today, the influence of narrative over emotion has resulted both indirectly and directly in the development of therapies that utilize narrative to treat emotional disorders.

Although it is clear that experiential framing by means of narration has an effect on emotion, it is not yet clear *how* (See Appendix 1 for an extended discussion). Lacking an understanding of precisely how narrative influences emotion both prevents the emergence of a robust model of emotion and stifles the potential optimization of narrative-based therapies. In order to address this issue, I propose a new narrative construct that provides an established vocabulary for discussing, and ultimately explaining, the relationship between narrative and emotion: *narrative reference frames*.

Chapter 2: Narrative Reference Frame (NRF) Theory

2.1 Narrative reference frames

As demonstrated through research in spatial cognition (cf. Klatzky, 1998), humans codify perceptual experiences according to reference frames. Because narration is our predominant means of communicating experiences (Laszlo, 2008) – and because the brain reuses adaptive functions in higher order networks (Martin, 2007) – it stands to reason that reference frames are employed in the narration of experiences. The application of spatial-perceptual frames of reference to narration produces what might be called *narrative reference frames* (NRFs)².

The human brain has evolved two separate pathways for representing relational information, and a third form of representing information arises from the combination of these pathways. The allocentric pathway, associated with activity in anterior temporal regions (Chechlacz et al., 2010), represents relational information independent of the observing agent (Klatzky, 1998). Figure 1a depicts a representation of allocentric framing: the location of the chair is defined relative to the other objects (the lamp), rather than relative to the observer. Taking bearings according to the north pole is an example of allocentric framing at work.

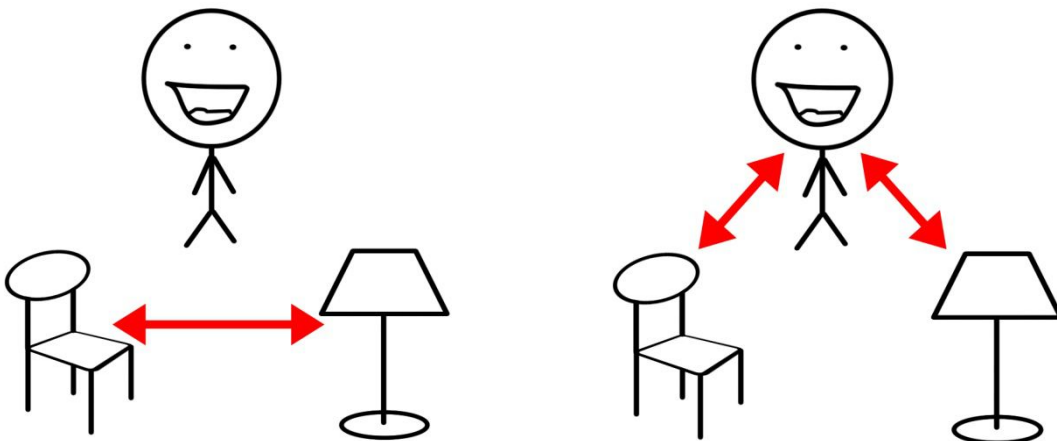


Figure 1a. Graphical depiction of allocentric framing. Figure 1b. Graphical depiction of egocentric framing.

² Note, the NRF concept is independent of *narrative points of view*. Narrative points of view are vantage points from which events are presented – these include first, second, and third person perspectives (Kirsznier & Mandell, 1993). NRFs are independent of narrative points of view precisely because NRFs can be used across first, second, and third person narratives.

The egocentric pathway, associated with activity in posterior temporal regions (Chechlacz et al., 2010), represents relational information in terms of the observer's point of view (Klatzky, 1998). Figure 1b depicts a representation of egocentric framing: the locations of the chair and lamp in space are relative to the observer. Demarcating landmarks as leftward or rightward is an example of egocentric framing at work.

Counterfactual representations relate a given state of events to a hypothetical state of events. Such representations are associated with both anterior and posterior temporal activation (Van Hoek et al., 2013). Counterfactual representations are a logical combination of allocentric and egocentric representations because counterfactual representations relate the current state of events from the observer's point of view to an alternative state of events independent of the observer. Figure 1c depicts a representation of counterfactual framing: the position of the lamp and chair relative to the observer is compared to a hypothetical alternative arrangement that is independent of the observer. Reimagining the design layout of a room is an instance during which counterfactual framing would be used.

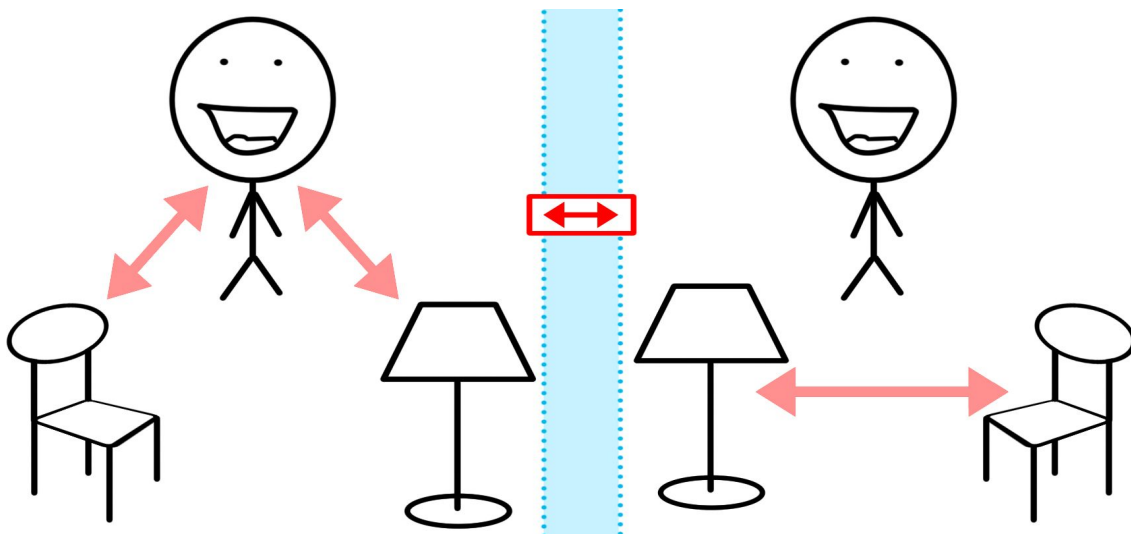


Figure 1c. Graphical depiction of counterfactual framing.

Three exhaustive language categories – descriptive, evaluative, and prescriptive (Zetterberg, 2006) – are related to the three modes of spatial framing. *Descriptive*

language expresses the intrinsic properties of objects and events – this sort of language is akin to the impersonal sort used in scientific writing. Descriptive language is fit to portray reality using facts derived from an objective disposition.

Evaluative language expresses the qualities of objects and events that are contingent on a speaker's worldview³. This is the sort of language used to communicate personal meaning and interpretations. In contrast to descriptive language, evaluative language is fit to convey appearances (rather than reality), based on opinions (rather than facts), that have been derived from a subjective (not objective) disposition.

Prescriptive language expresses a comparison of object and event qualities according to counterfactual standards. This is the sort of language used to communicate ideals or revisions of reality. In contrast to the other two language categories, prescriptive language is fit to portray *appraisals* using *fantasies* derived from a *normative* disposition.

Descriptive language is uniquely able to convey allocentric representations because, like allocentric framing, it is used to construe information as independent of an observer's worldview. For instance, the character in Figure 1a could provide an account of the scenario with the following *descriptive* statement: *The room contains a lamp and a chair*. This statement communicates information intrinsic to the situation but does not reveal anything about the speaker, because the information is independent of a particular worldview. Likewise, allocentric representations define spatial information independently of a particular individual's point of view.

Evaluative language is uniquely able to convey egocentric representations because, like egocentric framing, it is used to construe information in terms of an observer's worldview. For instance, the character in Figure 1b could explain the scenario with the following evaluative statement: *the chair and the lamp in this room go well together*. Note, aesthetic compatibility is not an intrinsic property but rather it is contingent on an idiosyncratic worldview – after all, another observer may state that the objects do not mesh well. Thus, this statement is more a matter of opinion than a matter of fact. Both the descriptive and evaluative statements communicate that there is a lamp and a chair in the room, but the

³ *Worldview* refers here to a personal cognitive orientation derived from experiences, values, and personality.

evaluative statement goes a step further and communicates a subjective interpretation of this information. In doing so, the evaluative statement imports the speaker's worldview into the information being communicated. Likewise, egocentric framing is characterised by the import of the observer's point of view into the spatial representation.

Prescriptive language is uniquely able to convey counterfactual representations because, like counterfactual representations, it is used to construe real states of events in terms of hypothetical standards that have been derived from a personal worldview. For instance, the character in figure 1c may make the prescriptive statement: *this room would look better if the chair and lamp swapped places*. This statement is somewhat descriptive – because it communicates that the room contains a lamp and a chair – and it is evaluative – because it imports the speaker's view concerning the aesthetic arraignment. However, this statement also imports information concerning a hypothetical furniture arraignment that is ideal according to the speaker's worldview. Thus, in making a prescriptive statement, the speaker compares an *evaluation* of the real world, to an abstract *description* of a fantasy world. Likewise, in counterfactual framing, an observer compares a current perspective with a fantastical perspective that is abstracted away from the observer's perceptual view.

Thus, there appears to be a strict isomorphism between language categories and spatial reference frames. Considering the widespread contribution of spatial processing across cognitive functions (Lindblad, 2010), and the fact that the brain reuses functional areas to integrate specific functions into higher order functions (Martin, 2007), it is likely that the three language categories are derived from the three representational pathways. As such, these language categories may be used to identify narrative frames that are rooted in innate perspective-taking pathways. Figure 2 depicts the relationship between spatial pathways, narrative frames, and language categories. Essentially, this figure suggests that the three types of NRFs are derived from spatial pathways of the same name, and are identifiable by three corresponding language categories. Whereas spatial reference frames relate perceivers to environmental information, narrative reference frames relate narrators to experiential information. Unless noted otherwise, for the rest of this paper, the terms allocentric, egocentric, and counterfactual will refer to narrative frames, rather than spatial pathways.

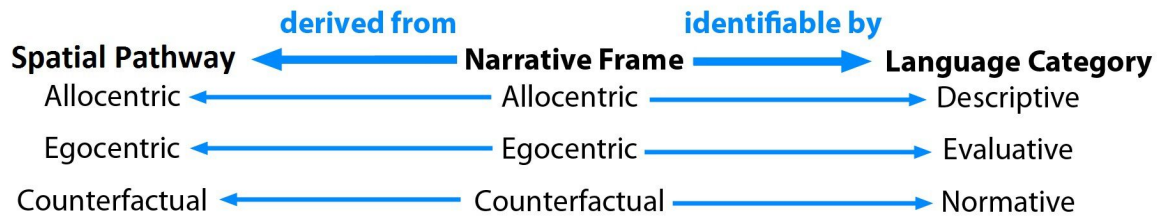


Figure 2. The relationship between perspectival pathways, perspectival narrative frames, and language categories.

Being a mode of construal, NRFs are a feature of narration rather than a feature of narratives. In other words, one does not communicate past narrative frames, but rather, one frames past narratives. This is a corollary of the fact that recollection is the process of organizing the past using the present self (Bruner, 1990). The statement *I thought that she was funny* communicates a fact about a prior state of mind without implicating the worldview of the *present* narrator. Alternatively, the statement *she was funny* smuggles in a bit of the present narrator – what he finds funny, or more generally, meaningful. It is such access to the mind of the present narrator that makes NRFs an apt basis for therapeutic insights and subsequent emotional influence.

2.2 Narrative reference frames and emotion

How narrative reference frames influence emotion is suggested by the two dominant camps of narrative-based therapies. *Reconstructive narrative therapies* intend to foster coherent patient narratives. Such narratives are characterized by multi-faceted, adaptive, and convincing causal explanations (McAdams, 2006). Alternatively, *elaborative narrative therapies* intend to foster narratives that consist in a deep exposition of past experiences (see Appendix 1 for a more in depth discussion of these camps).

In striving for either narrative ideal, an individual is forced to develop a large body of justified experiential evidence. For instance, the *elaboration* of an experience consists both of fully explaining the situation proper, but also explaining emotions and opinions associated with the situation. The elaboration of emotions and opinions is contingent on a basis of experiential facts. To move beyond merely describing a feeling or opinion (elaborating *what*), one must start to answer, and subsequently elaborate *why* and *how*, which inevitably implicates more gathering of evidence. Likewise, when developing a

coherent narrative, one attempts to derive convincing causal explanations – this processes necessarily consists of evidence gathering as well.

In terms of the NRF model, evidence gathering is the process of construing information in allocentric terms. This is because evidence gathering necessarily consists of using information outside of one's worldview to substantiate one's worldview. Because egocentric and counterfactual framing are both contingent on worldview, the process of narrative evidence gathering must be allocentric. Subsequently, because elaborative and reconstructive therapies encourage evidence gathering in patients, these therapies essentially encourage allocentric framing. It is allocentric framing, then, that bears the burden of explaining how narrative influences emotion. By explaining how increased allocentric framing can improve emotional well-being, we can derive an answer to the question of how narrative influences emotion. There are at least two possible explanations.

Firstly, because allocentric framing consists of construing information as independent of a speaker's worldview – and subsequently dependent on the state of events in the world – increasing this sort of framing can put individuals in touch with a more objective reality. Fostering a deeper connection with reality improves one's chances of efficaciously interacting with the world, thereby promoting feelings of mastery and subsequent positive moods. A deeper connection with reality also dissolves misunderstandings that may have been fuelling negative emotions. This explanation is in line with the Buddhist solution for emotional well-being. In Buddhism, Vipassanā meditation – referred to as mindfulness meditation in Western cultures (Bowen et al., 2006) – is used to facilitate perceptual synchronization with reality through the training of concentration and attention (Santina, 2001). This sort of synchronization enables practitioners to be perpetually aware of the incongruence between meaning and reality and the emotional suffering associated with conflating the two (Teasdale & Chaskalson, 2011).

A second way that allocentric framing influences emotions is by increasing one's psychological distance from evaluations (egocentric frames) and appraisals (counterfactual frames) that may arouse negative emotions. This idea is based on the

theory that emotions arise from the meaning that is attributed to events (Frijda, 2007). Rather than immediately identifying with one's appraisals – which may be incorrect or partial, thereby stirring negative moods and emotions – the predominantly allocentric narrator ensures that emotional reactions are justified. This sort of reasoning underlies Blackburn's cognitive therapy (see *reconstructive narrative therapies* in Appendix 1). This is also the idea that underlies the Stoic method of reappraisal, which consists of revising automatic judgements in order to attain and maintain emotional control (Oatley, 2010).

Although the NRF model is derived from literature concerning spatial reference frames and linguistics, the structure of this model has emerged elsewhere in psychology. Review of these related models reveals nuances in the NRF conception and lends support to the structure of the NRF model.

2.3 Concepts related to the NRF Model

Wong and Watt (1991), used content analysis to compile a taxonomy of reminiscence types that parses the structure of narrative recollection into six categories. Whereas the NRF system classifies types at the statement level, Wong and Watt's taxonomy classifies types of narrative accounts, as a whole. Thus, the analogy between systems is not perfect, however, there is some considerable overlap. For instance, *narrative reminiscence* is defined as a purely descriptive rather than interpretive recollection of the past. This sort of reminiscence corresponds to allocentric narrative types, because uninterpreted description characterizes both. *Escapist reminiscence* is characterized by exaggerations and boastings of the past. This sort of personal colourization in narration corresponds to the egocentric narrative type. However, egocentrism consists of more than just exaggeration as it pertains to *any* sort of interpretive twist that a narrator puts on remembered information.

Three other reminiscence types all correspond to the counterfactual NRF conception because they concern the integration of actual and possible worlds. *Integrative reminiscence* concerns reconciling the discrepancy between ideal and reality;

instrumental reminiscence concerns the application of past experiences to solve present problems; and *obsessive reminiscence* concerns ruminating about past negative events – which includes obsessing over possible causes.

The sixth reminiscence type does not clearly correspond to any NRF type but may correspond to any of the three. *Transmissive reminiscence* concerns passing on personal wisdom and cultural ideals. Passing on a cultural ideal can consist of communicating an uninterpreted cultural fact (allocentric); and sharing a personal wisdom can consist of sharing an opinion (egocentric), or gaining insight into past event (counterfactual). Note, having an insight into a past event during narration is counterfactual because it requires one to integrate online experiences into past experiences.

Meacham (1998) developed a theory of reminiscence and memory based on how the discipline of history has oriented itself towards the past. The theory demonstrates that there are four levels of history that each relate to levels of reminiscence. *Exact description* relates to strict storage and retrieval processes in memory – this corresponds to allocentric framing. *Discovery of meaning* relates to recoding, schemas and gist – this corresponds to egocentric framing because in both concepts, information is abstracted idiosyncratically. *Construction of meaning* relates to fantasies, fabrications, and projections – this corresponds to counterfactual framing because real events are substituted with alternative meaningful events. The fourth level, *selective description*, does not apply to the NRF system because it does not concern structure, but rather, content.

Although these models adhere to a similar structure, the NRF model maintains utility for at least two reasons. Firstly, the NRF model is based on concepts validated in neuropsychology, neurobiology and perceptual psychology, rather than concepts derived from content analysis alone. Thus, the NRF has more explanatory clout and a more plausible theoretical foundation. Secondly, the NRF goes beyond describing narrative structure to make clear predictions in clinical psychology – namely, predicting that fostering an increase of allocentric framing can improve emotional well-being.

Not all of the related research poses alternative models to the NRF. In fact, three converging concepts derived from research in narrative inquiry provide a basis for a deeper conception of egocentric framing. Labov (1972) suggested that narrators use *evaluative devices* to communicate their points of view on events in order to guide listeners towards the significance of their stories. Similarly, Tannen (1989) suggested that narrators regularly utilize *involvement devices*: linguistic ways that capture a narrators current stance towards a narrated subject. More recently, Hartman (1995) suggested that narrators employ *stylistic gestures*: lexical, syntactic, discursive, and performative gestures used to make sense of the past using the present self.

All three of these concepts suggest that narrators have a *way* of telling stories to highlight personal meaning, as experienced by the narrator at present. These three concepts supplement the notion that egocentric framing imposes a *personal* vantage point on what is being explained. Such personal colourization explains how two accounts of the same event can contain the same facts but communicate different meanings (Tannen, 1980).

Allocentric statements definitionally lack such personal colourization because they are impersonal. Alternatively, counterfactual statements make use of personal interpretations to draw conclusions about the past. Thus, counterfactual statements essentially communicate a point of view and then use that point of view to derive a new point of view. Consider the counterfactual statement: *the room would have looked better if the chair and lamp were swapped*. In making this statement, the point of view that the furniture arrangement looked bad substantiates the point of view that swapping the chair and the lamp would look good. This illustrates that counterfactual statements further colourize personal colourizations.

As such, the NRF types may be understood as increasing in degrees of personalization, with allocentric statements consisting of no personalization, and counterfactual statements consisting of the most personalization. Characterized in this way, counterfactual statements in narrative reveal most about a narrator, and allocentric statements reveal least. This feature of the NRF model produces additional clinical implications (see discussion), and suggests a more nuanced explanation of the influence

of narrative on emotion. By increasing allocentric framing, therapies simultaneously decrease narrative personalization, most strikingly when decreasing counterfactual framing. Thus, it should be expected that the most successful therapies create a hierarchy of NRFs by maximizing allocentric framing and minimizing counterfactual framing. Conversely, the most emotional disturbance should be characterized by a maximization of counterfactual framing and a minimization of allocentric framing.

To say that personalization has a negative effect on emotions is akin to saying that depersonalization (allocentric framing) has a positive effect on emotions. Thus, a rationale for the negative effect of personalization has already been proposed in section 2.2.

2.4 Hypotheses

The main focus of this research project is to verify the NRF model. Firstly, I hypothesise that the statements that constitute narrative accounts may be reliably identified as one of three types: allocentric, egocentric, or counterfactual. This hypothesis will be tested by measuring intercoder reliability of NRF judgements within a group of coders. Secondly, I hypothesise that the statements that constitute narrative accounts can only be categorized as one of the three NRF types. That is to say, that the tripartite model is exhaustive. This hypothesis will be tested by allowing coders to identify statements that do not fit into the three NRF categories. If there is strong intercoder reliability and the category system is proven to be exhaustive, the validity of the NRF model will be suggested.

This project includes a secondary investigation of the relationship between NRF proportionality and emotions. This investigation is secondary to the verification of the NRF model because the meaningfulness of any associations between NRF and emotions is contingent on the applicability of the NRF model. Thus the third, *conditional* hypothesis, is that participants who primarily produce a majority of allocentric narratives and a minority of counterfactual statements will have more adaptive emotional profiles than participants who produce the reverse pattern.

Specifically, I suspect that participants who produce allocentric narratives have more adaptive emotional profiles than those who produce a majority of egocentric and counterfactual statements. Likewise, because counterfactuals represent a higher degree of personalization, I suspect that participants who produce higher amounts of counterfactual statements will have less adaptive emotional profiles than participants who produce fewer counterfactual statements. I suspect similar associations with egocentric proportionality, however to a lesser extent because egocentric framing consists of less personalizing than counterfactual framing.

This third hypothesis will be tested by comparing participant NRF proportions, derived from coders judgements, to participant scores on an affect measure. Trait personality and Fluid IQ will be recorded as potential mediators – because they are fundamental determinants of narrative construal (Boehm & Lyubomirsk, 2009; Wetherell, Botting, & Conti-Ramsden, 2007). Demographic information will be collected and used in mediation analysis because there are clear gender and cultural differences in emotional and perspectival dispositions (Bromet et al., 2011; Li, Abarbanell, Gleitman, & Papafragou, 2011). In order to rule out the potential confounding influence of verbal ability on narrative structure, verbal IQ will be measured and included in the analysis. In order to better understand the status of the NRF model, a general exploratory analysis will be conducted, considering all of the collected variables.

Chapter 3: Methods

3.1 Participants

Approximately half of the participants ($n=26$) were recruited through postings on the crowdsourcing website, Amazon Mechanical Turk⁴. Participation was restricted to Masters Level workers – users that have an approval rating above 98%, and a history of participating in many wide ranging projects on the website. The rest of the participants ($n=22$) were recruited through postings on the crowdsourcing website CrowdFlower⁵. Participation was restricted to Level 3 contributors – workers that maintain the highest level of accuracy across a variety of tasks – located in Australia, Canada, Ireland, New Zealand, United Kingdom, and United States.

The suggested completion time for the task was 90 minutes, and the average compensation was \$4.25 per participant. Crowdsourcing through Amazon Mechanical Turk has been shown to be an effective method for collecting reliable natural language responses (Saunders, Bex, & Woods, 2013). Likewise, Crowdfower has been shown to be an effective and reliable platform for generating language data (Zhai et al., 2013). The choice was made to split the data between Crowdfower and Amazon Turk to avoid any potential anomalous effects that may be particular to one crowdsourcing website.

The ages of the total group of participants ($n=48$) ranged from 19 to 70, with a median age of 40. 48% of participants were below the median age. The group was predominantly female ($n=30$), and Caucasian ($n=45$) – two participants identified themselves as Asian, and one as Hispanic. The participants were located in the United States of America ($n=35$), the United Kingdom ($n=7$), and Canada ($n=6$). The annual reported income of participants ranged from less than \$20,000 ($n=13$), to more than \$106,000 ($n=2$), with a median income of \$33,000. The average educational background was completion of college.

According to the Canadian National Occupational Classification System (Human Resources and Skills Development Canada, 2011), the majority of participants reported to

⁴ www.mturk.com

⁵ www.crowdflower.com

be in management (n=9), education, social, community and government services (n=9), or sales and service occupations (n=8). The rest of the participants reported business, finance, and administration (n=4); full time studies (n=4); natural and applied sciences and related occupations (n=4); occupations in art, culture, recreation and sport (n=4); trades, transport and equipment operators and related occupations (n=3); and, health occupations (n=1). Two participants did not disclose their occupations.

3.2 Procedure

The study was prepared using Qualtrics, and the data were entered and stored on the Qualtrics server. After signing the consent form using their crowdsourcing IDs, participants were asked to fill out a demographics survey consisting of age, gender of identification, annual income, occupation, educational background, ethnicity, country of birth, and country of residence.

The next section consisted of a series of narrative report tasks that began with the following instruction: *Over the next few pages, you will be asked to provide a recollection of different events from your past. Before providing your recollection, take a moment to lose yourself in a daydream of the event you choose to recall.* The participants were asked to provide a recollection rather than a description to avoid influencing an impersonal style of narration. Likewise, participants were asked to enter a state of reverie to encourage more natural narration.

The first task in the narrative block instructed participants to recall their earliest memory. This task functioned to get the participants into the flow of narration, and to define the earliest boundary of memory – the data from this task was not included in the narrative analysis. Next, participants were presented with one of three randomized prompts that instructed them to recollect a neutral, positive, or negative experience. These prompts were randomized in order to avoid the potential influence of valence sequence on recollection style. The specific prompts that were used are presented in Table 1. The prompts include a disclaimer regarding the required intensity of the event in order to

guide participants, ensure a diversity of narrative intensities, and protect participants that might consider recalling traumatic events.

Condition	Prompt
Warm-up	Please take a moment to imagine your earliest memory. When you are ready, recall this event.
Positive	Please take a moment to imagine a positive event from any time in your past. This does not need to be the most positive event from your past – but it can be. When you are ready, recall the memory you chose.
Negative	Please take a moment to imagine a negative event from any time in your past. This does not need to be the most negative event from your past – but it can be, if you are comfortable with recollecting this memory. When you are ready, recall the memory you chose.
Neutral	Please take a moment to imagine an ordinary event from any time in your past, one that doesn't make you particularly happy or sad. When you are ready, recall the memory you chose.

Table 1. Prompts used in the narrative task.

Participants were required to type a minimum of 1160⁶ characters in response to each narrative prompt before moving onto the next prompt. This limit was set to ensure that a pattern of NRF dominance could emerge in each narrative. In order to determine the conscientiousness of responses, attentiveness was screened by asking participants to summarize each narrative with three words at the end of the narrative block.

The next section surveyed participant affect using the Positive and Negative Affect Schedule – Expanded Form (PANAS-X; Watson & Clark, 1994), a valid and reliable measure of affect (Howell, Rodzon, Kurai & Sanchez, 2010). The schedule was adapted for Qualtrics using a five point Likert scale. In order to more accurately interpret PANAS-X responses, participants were asked if they had recently experienced a life-changing event.

Following the PANAS-X, personality was measured using the Big Five Aspect Scale (BFAS; DeYoung, Quilty, & Peterson, 2007) – a valid and reliable measure of personality that parses the Big Five model into ten constituent traits. In order to check for conscientious responding at this point, participants were asked to rate how well the definitions of neuroticism and openness represent their personalities. If these ratings

⁶ This value was derived from the following calculation: participants have a less than 5% chance of producing an even proportion of NRF types in 18 sentences (0.04349% according to a multinomial calculation assuming the probability of each statement being equal). Because the average English sentence length is 14.3 words (Senthil Kumar, 2011), and the average English word is roughly 4.5 characters long (Pierce, 1980), 18 sentences can be collected if participants are required to write at least $(4.5 * 14.3 * 18) \approx 1160$ characters.

significantly differed from the BFAS scores it would suggest unconscientious responding. Conscientiousness checks of the sort used in this study have been shown to be reliable when used in online studies (Kittur, Chi & Suh, 2008).

Fluid IQ was assessed using a shortened and timed version of Raven's Matrices – the best individual measure of fluid g (Carrol, 1993). Participants were given ten minutes to complete ten matrices, after which they were given 12 minutes to complete the Wonderlic Personnel Test (WPT; Wonderlic, 1992), in order to assess verbal ability. Research has established that the WPT is a reliable measure of verbal intelligence that is significantly correlated with Verbal IQ scores derived from the Wechsler Adult Intelligence Scale (WAIS-R), $r=.86$, $p<.001$ (Hawkins, Faraone, Pepple, Seidman & Tsuang, 1990). At the end of this block of surveys, participants were asked to read and sign a debriefing form, after which they were provided with a payment code that could be used on the associated crowdsourcing websites to receive payment.

3.3 Coding

Four research assistants – three females (T, P and Q) and one male (S) – were trained to code narratives, sentence by sentence, into five categories: allocentric, egocentric, counterfactual, out of narrative, and other. The first three categories correspond to the constructs of interest in this project. *Out of narrative* statements were classified as statements that are not constituents of the story – for instance, comments on the survey process. These statements were differentiated because they are beyond the scope of the current project, which is concerned solely with the structure of narratives. The *other* category was included to verify whether narrative statements can be classified into more than three NRF categories.

Training consisted of two in-lab group training sessions, six homework coding assignments and one test. In the first in-lab training session, the research assistants were introduced to the NRF categories using the table depicted in Appendix 2. After reviewing said table, the research assistants each generated three examples of each NRF type. This first session included a group coding activity during which all participants coded three

fictional narratives and two narratives that were collected during the pilot study, sentence by sentence. The research assistants were required to provide justification for their coding selections and feedback was provided to them concerning conceptual understanding. In the second in-lab training session, the research assistants familiarized themselves with the flowchart depicted in Appendix 3. This session included a similar group coding activity using five narratives that were collected during the pilot.

Once the in-lab training sessions were completed, the research assistants were assigned de-identified narratives derived from the pilot to code alone at home. The first assignment consisted of coding three narratives, the second assignment consisted of six narratives, and subsequent assignments consisted of coding a single narrative. The homework assignments were completed sequentially using narratives that increased in complexity – based on my judgements of readability, formality, formatting, and consistency. After each completed assignment was submitted, I reviewed the coding choices and provided feedback consisting of conceptual elaboration in response to inappropriately coded sentences and appropriately coded *complex* sentences. After three homework assignments, a test was administered to assess the conceptual understanding of the group (see Appendix 4). Because two of the coders (T and Q) demonstrated poor conceptual understanding by scoring less than 70% on the test, two more homework assignments were administered and a more elaborate training document was reviewed by each coder (see Appendix 5) – as suggested by Lombard, Snyder-Duch and Bracken (2005).

The original plan had been to transition to official coding once a stable learning pattern had emerged, however, no stable learning pattern appeared, as can be seen in Figure 3. This was likely due, in part, to the increasing qualitative differentiation of the homework assignments. Rather than verifying the training with additional qualitatively similar narratives, the decision was made to go forward with the official coding, due to the time-consuming nature of the project.

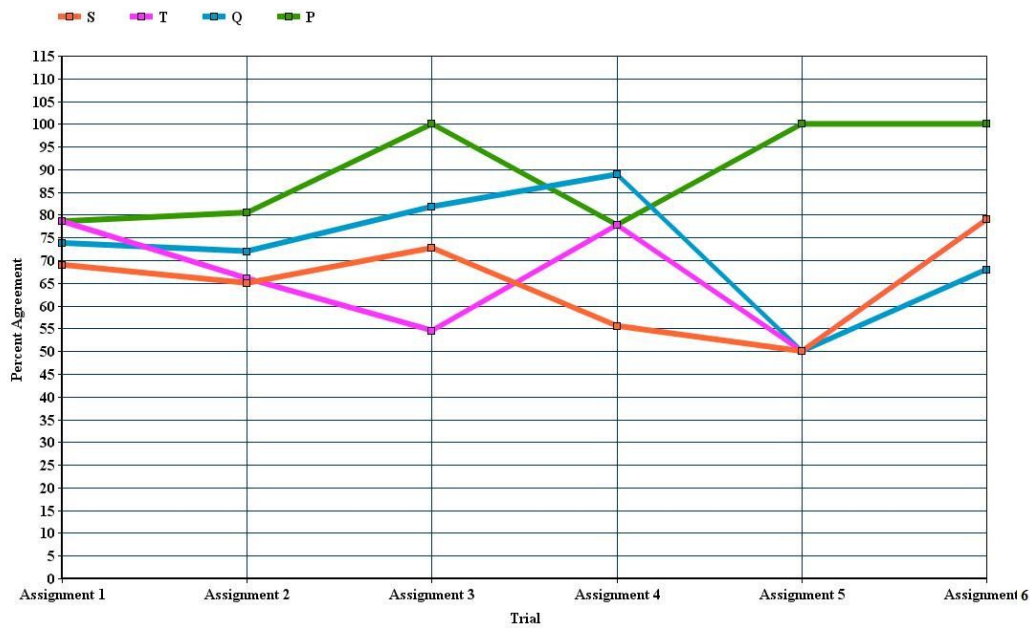


Figure 3. Percent agreement with my coding judgements for coders S, T, Q, and P across 6 assignments.

Before commencing the official coding, the research assistants reviewed a set of coding rules that described the exact coding procedure for the study. The rules outlined the procedures for highlighting suspect material, provided a numerical legend for the categories, and asked the coders to conscientiously code alone. The narratives were de-identified and organized into 4 blocks of 36 (12 participants x 3 narratives). The research assistants only coded one block at a time, individually. Coding was done in a word processor, and later transferred into a spreadsheet by the corresponding research assistant. After two blocks were completed, a higher-level explanation of concepts was provided to the research assistants (see Appendix 6) – as suggested by Lombard et al. (2005).

Chapter 4: Results

4.1 Data

A total of 144 narratives were coded – three narratives for each of the 48 participants. This sample size was well within the range of the typical data used in narrative analysis studies, where sample sizes rarely exceed 50 participants (Fraser, 2004). The average narrative length was 16 sentences and the total number of coded sentences was 2296. Although four research assistants were trained to code the narratives, only two coders were included in the analysis (P and Q). S was excluded from the analysis because he left the project to pursue personal obligations after completing only 25% of the work assigned to him. T was excluded from the analysis due to unconscientious coding, as indicated by narrative deletion, overlooking statements, 84 statement omissions in the compiled spreadsheet and coding non-statements – for instance, coding the middle of words or sentences.

4.2 Trends

The fundamental unit of comparing agreement between coders was the code attributed to each sentence. For both P and Q, every sentence ($n=2296$) was coded as either allocentric, egocentric, counterfactual, or out of narrative. There were no statements that were part of the narration and not coded as one of the three NRFs. This lends support to *hypothesis 2*, that the tripartite NRF model is exhaustive.

The frequency distribution of agreement (%) between P and Q on NRF judgements at the *narrative* level followed a normal distribution (see figure 4a), with a mean of 68.3 (SD=13.36, $n=144$). Thus, the most common level of agreement on NRF types in narratives was around 68%. The frequency distribution of agreement (%) between P and Q at the *participant* level followed a bi-modal distribution (see figure 4b), with a mean of 68.2 (SD=9.02, $n=48$). To investigate the source of this distribution discrepancy, P and Q rated the quality of the narratives on eight dimensions – formatting, readability, complexity, sentence length, formality, consistency, intensity, and conscientiousness (see Appendix 7 for definitions).

Pairwise analysis was conducted using this narrative quality information and P and Q's agreement (%) on NRF judgements. The reliability of the coded qualities is suggested by intercorrelations among dimensions. For instance, as would be expected of conscientiously written narratives, they were associated with increased formatting ($r=.586$, $p<.001$), readability ($r=.499$, $p<.001$), formality ($r=.471$, $p<.001$), consistency ($r=.586$, $p<.001$), and intensity ($r=.236$, $p<.005$), but not complexity, sentence length, or valence.

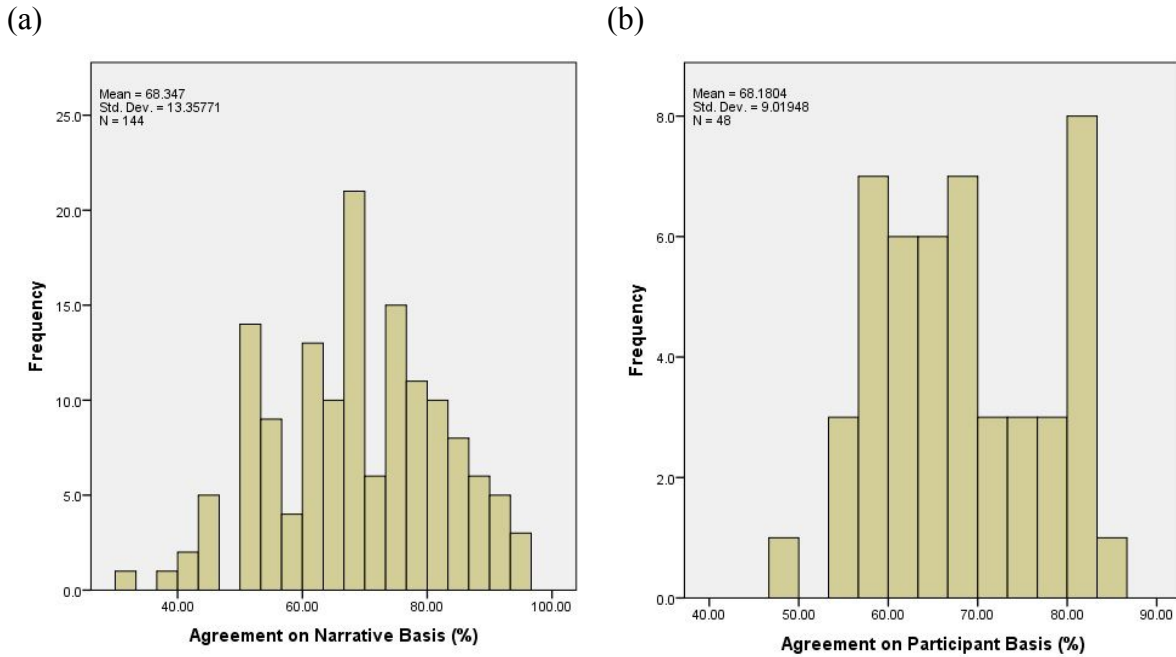


Figure 4a. Frequency distribution of percent agreement on a narrative by narrative basis.

Figure 4b. Frequency distribution of percent agreement on a participant by participant basis.

P and Q's agreement (%) at the participant level ($n=48$) was only significantly associated with narrative consistency ($r=.296$, $p<.05$). Dummy coding of the agreement in the first mode (58 to 69.5%) and second mode (80 to 82.5%) in the participant comparison (Figure 4b) revealed that conscientious writing style had a near significant effect on the second mode ($r=.280$, $p=.054$). There were no near-significant effects on the first mode. This suggests that general coding agreement at the level of the participant is contingent on narrator consistency, but high coding agreement at the level of the participant is contingent on the conscientiousness of narration.

Both stepwise and backwards regression using the eight quality dimensions revealed that readability and consistency together are the best predictors of percent agreement at the participant level, explaining 17.2% of the variance ($p < .01$). The eight dimensions together did not create a significant model of percent agreement at the participant level ($R^2 = .273$, $p > .05$). Removing complexity and intensity from the regression produced the largest significant predictive model of percent agreement per participant, explaining 27.2% ($p < .05$). This means that 72.8% of the variation in percent agreement per participant, including error, is explained by variables other than the eight quality dimensions.

Percent agreement at the narrative level ($n = 144$) was significantly associated with conscientious writing style ($r = .223$, $p < .01$), narrator consistency ($r = .210$, $p < .001$), and narrator formality ($r = .210$, $p < .01$). According to both backward regression and stepwise regression, agreement (%) between P and Q for narratives is best predicted by narrative consistency ($R^2 = .078$, $p < .001$). Formality, consistency, and conscientious writing style together explain 8.7% of the variation in agreement on narratives ($p < .01$), whereas the eight dimensions together explain 13.5% ($p < .01$) of the variation – as indicated by multiple regression. This means that 86.5% of the variation in narrative percent agreement, including error, is due to factors outside of the eight quality dimensions.

Thus, the difference in percent agreement at narrative and participant levels is partly due to the fact that agreement at the narrative level is subject to more influences, and partly due to the fact that percent agreement at the participant level is best predicted by two variables that influence different aspects of agreement. Pairwise associations between quality and percent agreement at a statement level could not be conducted using the narrative quality data because the quality dimensions are emergent properties of complete narratives.

4.3 Intercoder reliability

Average pairwise percent agreement was calculated on all of the coded narrative sentences ($n = 2296$), revealing a pairwise agreement between P and Q of 68.3% – this is

in line with the mean of the frequency distributions. This value should be interpreted with caution due to the limitations of pairwise percent agreement – namely, this value does not contain a comparative reference point and may conceal important disagreements (Joyce, 2013). For all of the coded narrative sentences ($n=2296$), Cohen's kappa was calculated. According to the guidelines of Landis & Koch (1977), there was moderate agreement between P and Q's judgements, $k=.502$ (95% CI, .473 to .531), $p < .001$. Thus, there is moderate support for *hypothesis 1*, that narrative perspectives can be reliably identified by coders.

Out of 2296 cases, there were 1568 agreements and 728 disagreements. As can be seen in the descriptive crosstabulation data in Table 2, the frequency of agreement is greater than the frequency of disagreement for every category except “out of narrative” where P coded 23 sentences as “out of narrative” whereas Q coded only 1. Table 2 also indicates that P and Q coded categories with similar frequencies – out of narrative statements were least common (P: 1.00%, Q: 0.04%), followed by counterfactual statements (P:19.69%, Q:19.47%), allocentric statements (P:32.80%, Q: 35.58%), and most common were egocentric statements (P: 46.52%, Q:44.90%).

		Q				
		Out of Narrative	Allocentric	Egocentric	Counterfactual	Total
P	Out of Narrative	1	6	12	4	23
	Allocentric	0	574	152	27	753
	Egocentric	0	187	729	152	1068
	Counterfactual	0	50	138	264	452
Total		1	817	1031	447	2296

Table 2. Crosstabulation comparing overlap on the four coded categories for coders P and Q.

To investigate the conditions unique to each coder concerning the attribution of each narrative category, a pairwise analysis was conducted using the proportion of allocentric, egocentric, and counterfactual judgements unique to each coder on a narrative level, the eight quality dimensions, narrative valence, and percent agreement ($n=144$). There was a significant correlation between percent agreement on narratives and the proportion of allocentric ($r=.192$, $p<.05$), counterfactual ($r= -.240$, $p<.005$), and out of narrative ($r= -.209$, $p=.012$) statements coded by P. This means that the chance of agreement

between P and Q increased when P coded more allocentric statements, and decreased when P coded more counterfactual and out of narrative statements.

As indicated by the correlations between the quality dimensions and P's proportion of allocentric statements, P's coding of allocentric statements increased when narratives were better formatted ($R=.273$, $p=.001$), more readable ($R=.220$, $p<.01$), more consistent ($r=.330$, $p<.001$), less complex ($r=-.173$, $p<.05$), with shorter sentences ($r=-.256$, $p<.005$). In other words, P tended to code more allocentric statements when narratives were clear and simple. P's coding of egocentric statements increased only when narratives were less formatted ($r=-.168$, $p<.05$), and P's coding of counterfactual statements increased as narratives became more intense ($r=.244$, $p<.005$), less consistent ($r=-.225$, $p<.01$), and less formatted ($r=-.170$, $p<.05$). Thus, P's counterfactual judgements were contingent on the disorder of a narrative. P's coding of *out of narrative* statements was not associated with any quality dimensions.

Q tended to code more allocentric statements when narratives were better formatted ($r=.303$, $p<.001$), more readable ($r=.287$, $p<.001$), more formal ($r=.207$, $p<.05$), more consistent ($r=.361$, $p<.001$), more conscientiously written ($r=.264$, $p<.005$), with shorter sentences ($r=-.216$, $p<.01$). Thus, like P, Q coded simple and clear narratives as more allocentric. Q tended to code more egocentric statements when narratives were more intense ($r=.209$, $p=.05$), less formatted ($r=-.393$, $p<.001$), less formal ($r=-.296$, $p<.001$), less consistent ($r=-.182$, $p=.05$), less readable ($r=-.208$, $p<.05$) and less conscientiously written ($r=-.176$, $p<.05$). In other words, Q made more egocentric judgements when narrative disorder increased. This is similar to the pattern of associations between quality and counterfactual judgements for P, however, it is much more complex than the pattern of associations between quality and egocentric judgements for P.

Q's coding of counterfactual statements increased as narratives became less formatted ($r=-.196$, $p<.05$), less formal ($r=-.239$, $p=.005$), less consistent ($r=-.174$, $p<.05$), and less readable ($r=-.346$, $p<.001$). Thus, for Q, counterfactual statements also increased as narratives became increasingly disorganized. Mediation and moderation analyses concerning the influence of narrative valence condition revealed no significant effects.

The similar influence of narrative qualities on P and Q's coding may be interpreted in three ways. Firstly, it may be that specific properties are associated with the use of narrative perspectives. For instance, because allocentric narratives are definitionally structured to communicate facts, such narratives will likely be more clear and concise than the other types of narratives. However, this explanation does not account for the fact that Q's coding is influenced by more qualitative dimensions than P's coding.

This discrepancy may be explained by a second interpretation: that P and Q were implicitly trained to look for these qualities when coding. Specifically, the coders may have been trained to rely on qualitative cues to different extents due to different patterns of reinforcement. Finally, the coders may have been using different strategies. Support for this final explanation comes from differences in P and Q's coding time as well as the variation explained by the qualitative dimensions. The average coding time per narrative for P was 17.3 minutes, and the quality dimensions predicted 13.4% of the variability in P's egocentric attributions ($p < .05$). Alternately, the average coding time per narrative for Q was 15.1 minutes and the quality dimensions predicted 22.8% of the variability in Q's egocentric attributions ($p < .001$). This suggests that Q's strategy was to rely more on the qualitative dimensions of narratives, thereby using context to expedite the coding process.

4.4 NRF proportionality and narrator features

Because this study only had moderate intercoder reliability, there is no precise account of NRF type proportionality – only estimates based on P's coding, Q's coding, and the average of P's and Q's coding. Thus, to investigate the relationship between NRF type proportionality and participant data, analyses were done three times – once with each coding source. Results that were significant across all three analyses are interpreted as more real than results that were associated with only one coding source. Results that were significant for only one coder are interpreted as reflecting a bias or strategy of the coder, rather than reflecting a relationship between narrative framing tendencies and participant qualities.

The ranking system presented in Table 3 was used to establish degrees of validity. This system is predicated on the principle of convergent validity. Associations that are ranked 1 to 3 are considered to be reflective of patterns pertaining to the participants (narrator-specific), whereas those ranked 4 or 5 are considered to be coder-specific. Although associations ranked with 4 contain two significant coding sources, they are considered coder-specific because the significance of the average coding judgement is a consequence of a very significant single coder judgement. Rather than being indicative of a participant generated phenomenon, this pattern suggests a strong bias for one of the coders.

Rank	Condition
1	Both coders' judgements, and the average of both judgements, are significantly associated with X ($p < .05$)
2	In association with X, one coder's judgements are significant ($p < .05$), the other coder's judgements are near significant ($.80 > p > .05$), and the average of both judgements is significant ($p < .05$)
3	In association with X, both coders' judgements are near significant ($.80 > p > .05$), and the average of both judgements is significant ($p < .05$)
4	In association with X, one coder's judgements are significant ($p < .05$), the other coder's judgements are not near significant ($p > .80$), and the average of both judgements is significant ($p < .05$)
5	Only one coder's judgements are significantly associated with X ($p < .05$), and the average of both coder's judgements is not.

Table 3. Rankings of correlation validity based on convergence.

The proportions of NRF type were calculated by dividing the frequency of a specific NRF type in a narrative by the total number of statements in that narrative. This calculation was done at the narrative level, deriving the proportions of narrative frames in each valance condition, as well as at the participant level, summing across valance conditions. Because there are three coding sources, and three narrative types, this resulted in 36 variables ($4 \times 3 \times 3$) reflecting narrative proportionality.

To compensate for the moderate intercoder reliability, only participants associated with an agreement (%) score higher than the mean agreement ($> 68\%$), were included in this analysis ($n=23$). Moreover, participants within this group that demonstrated unconscientious response patterns by failing the conscientiousness checks and providing unvarying Likert responses were excluded from this analysis ($n=2$). Thus, the total number of participants for this analysis was 21. The intercoder reliability for the 1003

statements corresponding to these 21 participants represents substantial agreement as indicated by the guidelines of Landis and Koch (1977), with $k=.615$ (95% CI, .572 to .658), $p<.001$. Thus, the connections are meaningful, but should be interpreted with some caution.

4.4.1 Personality and NRF proportionality

A pairwise analysis was conducted to compare NRF proportions to the ten aspects of the BFAS – enthusiasm, assertiveness, compassion, politeness, industriousness, orderliness, withdrawal, volatility, intellect, and openness – and the associated Big Five traits – extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. Table 4 presents the significant associations, organized by ranking of convergent validity within each response set.

Set	Pair	Coder P	Coder Q	Avg of P & Q	Rank
Participant	Neuroticism & Counterfactual	$r=.477$ $p=.029$	$r=.524$ $p=.015$	$r=.533$ $p=.013$	1
	Withdrawal & Counterfactual	$r=.418$ $p=.059$	$r=.494$ $p=.023$	$r=.487$ $p=.025$	2
	Intellect & Counterfactual	$r=-.400$ $p=.072$	$r=-.468$ $p=.032$	$r=-.462$ $p=.034$	2
	Volatility & Counterfactual	$r=.418$ $p=.059$	$r=.420$ $p=.058$	$r=.445$ $p=.043$	3
	Intellect & Allocentric	$r=.323$ $p=.153$	$r=.467$ $p=.033^*$	$r=.424$ $p=.056$	5
Positive	Volatility & Allocentric	$r=-.511$ $p=.018$	$r=-.400$ $p=.073$	$r=-.464$ $p=.034$	2
	Neuroticism & Counterfactual	$r=.417$ $p=.060$	$r=.541$ $p=.011$	$r=.513$ $p=.017$	2
	Withdrawal & Counterfactual	$r=.274$ $p=.229$	$r=.439$ $p=.046^*$	$r=.385$ $p=.085$	5
Negative	Withdrawal & Counterfactual	$r=.404$ $p=.069$	$r=.176$ $p=.072$	$r=.438$ $p=.047$	3
	Intellect & Allocentric	$r=.362$ $p=.107$	$r=.495$ $p=.022^*$	$r=.480$ $p=.028$	4
	Intellect & Counterfactual	$r=-.259$ $p=.256$	$r=-.464$ $p=.034^*$	$r=-.407$ $p=.067$	5
Neutral	Intellect & Counterfactual	$r=-.445$ $p=.043^*$	$r=-.334$ $p=.138$	$r=-.419$ $p=.059$	5
	Openness to Experience & Counterfactual	$r=-.470$ $p=.031^*$	$r=-.131$ $p=.571$	$r=-.318$ $p=.160$	5

Table 4. Significant correlations between NRF proportionality and personality traits/aspects as measured by BFAS ($n=21$), ranked per narrative set according to convergent validity.

*indicates the significant coder in coder-specific associations.

The only two significant Big Five traits were neuroticism and openness. Whereas both aspects of neuroticism – volatility and withdrawal – were significantly associated with NRF proportionality, only the intellect aspect of openness to experience was a significant predictor. Neuroticism and its corresponding aspects were all positively correlated with counterfactual proportionality, and negatively correlated with allocentric proportionality across sets and ranks. Conversely, openness to experience and its corresponding aspect were positively correlated with allocentric proportionality, and negatively correlated with counterfactual proportionality, across sets and ranks. Only counterfactual and allocentric proportionality were predicted by personality traits/aspects – egocentric proportionality was not.

Because the correlation between neuroticism and counterfactual proportionality at the participant level was the only association that was significant for all three coding sources, this association is considered most real. In other words, it is most likely that this data reflect that participants high in trait neuroticism will produce more counterfactual statements in their narrative recollections. The alternative interpretation, reserved for associations ranked 4 or 5, is that participants high in a specific trait/aspect are more likely to be *interpreted* as producing more counterfactual statements. This interpretation suggests that certain narration styles are associated with specific personality traits/aspects, and that these styles influence coders' judgements – this possibility will be investigated in the discussion section.

There were six significant coder-specific associations (rank 4 or 5) and seven significant narrator-specific associations (rank 1 to 3). Of the six coder-specific associations, five pertained to openness to experience (4 intellect, and 1 openness to experience), and four were specific to Q. Out of the five narrator-specific associations, only one pertained to allocentric proportionality – volatility in the positive narrative condition. The correlation between intellect and counterfactual framing was a coder-specific feature for negative and neutral narratives, and narrator-specific at the participant level. This is because the association between intellect and counterfactual proportionality was coder-specific for both coders (simply in different conditions).

The participant set contained most of the significant correlations that were found (38%), and the majority were narrator-specific (80%). Conversely, the neutral set consisted of the fewest associations (15%) and only coder-specific associations. The significant correlation between withdrawal and counterfactual proportion was the only association to arise in more than two sets – though, it was coder-specific in positive narratives. Volatility was the only narrator-specific quality that was not correlated with the same NRF in more than one set. Similarly, openness to experience was the only coder-specific quality that was not correlated with the same NRF in more than one set.

4.4.2 Affect and NRF Proportionality

A pairwise analysis was conducted to compare participant affect, derived from the PANAS-X, with NRF proportionality. The scale sorts responses into 12 dimensions: general negative affect, fear, sadness, guilt, hostility, shyness, fatigue, general positive affect, joviality, self-assurance, attentiveness, serenity, and surprise. To eliminate potential masking effects caused by participants who had experienced a recent life changing event, two participants were excluded from the analysis (total $n=19$). Note, the analysis was rerun including these two participants and the significant correlations between hostility and NRF proportions disappeared. Significant correlations for the reduced set are presented in Table 5, organised according to rank within each narrative set.

Set	Pair	Coder P	Coder Q	Avg of P & Q	Rank
Participant	Fatigue & Egocentric	$r = -.523$ $p = .021$	$r = -.529$ $p = .020$	$r = -.571$ $p = .011$	1
	Fatigue & Allocentric	$r = .421$ $p = .073$	$r = .581$ $p = .009$	$r = .534$ $p = .019$	2
	Joviality & Egocentric	$r = -.459$ $p = .048^*$	$r = -.246$ $p = .310$	$r = -.374$ $p = .114$	5
	Hostility & Counterfactual	$r = -.218$ $p = .369$	$r = -.456$ $p = .050^*$	$r = -.367$ $p = .122$	5
Positive	Fatigue & Egocentric	$r = -.545$ $p = .016$	$r = -.670$ $p = .002$	$r = -.637$ $p = .003$	1
	Hostility & Allocentric	$r = .433$ $p = .064$	$r = .611$ $p = .005$	$r = .545$ $p = .016$	2
	Hostility & Egocentric	$r = -.444$ $p = .057$	$r = -.423$ $p = .071$	$r = -.457$ $p = .049$	3
	Fatigue & Allocentric	$r = .361$ $p = .129$	$r = .545$ $p = .016^*$	$r = .474$ $p = .040$	4
	Hostility & Counterfactual	$r = -.051$ $p = .837$	$r = -.462$ $p = .046^*$	$r = -.290$ $p = .228$	5
Negative	Fatigue & Allocentric	$r = .518$ $p = .023$	$r = .633$ $p = .004$	$r = .636$ $p = .003$	1
	Fatigue & Egocentric	$r = -.412$ $p = .080$	$r = -.457$ $p = .049$	$r = -.514$ $p = .024$	2
Neutral	Joviality & Egocentric	$r = -.461$ $p = .047^*$	$r = -.317$ $p = .186$	$r = -.418$ $p = .075$	5

Table 5. Significant correlations between NRF proportionality and affect dimensions measured by PANAS-X ($n=19$), ranked per narrative set according to convergent validity.

* indicates the significant coder in coder-specific associations.

Only three affective dimensions significantly correlated with NRF proportionality: fatigue, joviality, and hostility. To be clear on the meaning of these terms, Table 6 lists the constituent facets of these dimensions. Across conditions, fatigue was positively correlated with allocentric proportionality, and negatively correlated with egocentric proportionality. Fatigue did not significantly correlate with counterfactual proportionality. Hostility was negatively associated with egocentric and counterfactual proportionality, and positively associated with allocentric proportionality. Joviality was negatively correlated with egocentric proportionality, and was not correlated with allocentric or counterfactual proportionality.

Dimension	Components
Fatigue	sleepiness, tiredness, sluggishness, and drowsiness
Joviality	cheerfulness, happiness, joyfulness, delightedness, enthusiasm, excitement, liveliness, and energetic disposition
Hostility	anger, irritability, hostility, scornfulness, disgust, and loathing

Table 6. Components of the PANAS-X dimensions that are significantly associated with NRF proportionality.

The ratio of coder-specific to narrator-specific associations was 7 to 5. P and Q were each affiliated with two 5th rank coder-specific associations. Both correlations that included joviality were coder-specific (rank 5) for coder P, suggesting that P used a narrative style associated with neg-joviality to code egocentric statements. The correlation between fatigue and egocentric proportionality was first rank in two sets – in the positive narrative and participant sets – and the correlation between fatigue and allocentric proportionality was first rank in the negative set. This suggests that fatigue was the most likely mood to influence the proportionality of narrative frames.

The fatigue-allocentric and fatigue-egocentric correlations were the only pairs to occur in more than two sets – both occurred in the positive, negative, and participant sets. The hostility-allocentric and the hostility-egocentric were the only pairs to occur in only one set – both were limited to the positive narrative set. Hostility was the only affective dimension to correlate with all three NRF types, entirely in the positive narrative set.

4.4.3 IQ, demographics and NRF proportionality

A pairwise analysis comparing measures of IQ – Raven's matrices and WPS's verbal subset – revealed only coder-specific associations (see Table 7). All three significant correlations pertained to P's judgements – two concerned counterfactual proportionality and one concerned egocentric proportionality. WPS and Raven's were negatively associated with counterfactual proportionality and WPS was negatively associated with egocentric proportionality.

Set	Pair	P	Q	Avg of P&Q	Rank
Participant	Raven's & Counterfactual	$r = -.517$ $p = .016^*$	$r = -.225$ $p = .326$	$r = -.381$ $p = .088$	5
Neutral	WPS (verbal) & Egocentric	$r = .438$ $p = .047^*$	$r = .174$ $p = .451$	$r = .331$ $p = .143$	5
	WPS (verbal) & Counterfactual	$r = -.436$ $p = .048^*$	$r = -.050$ $p = .829$	$r = -.255$ $p = .265$	5

Table 7. Significant correlations between NRF proportionality and IQ measured by WPS and Raven's ($n=21$), ranked per narrative set according to convergent validity.

* indicates the significant coder in coder-specific associations.

Finally, pairwise associations between NRF proportionality, demographic information and completion time were analysed (Table 8). The analysis revealed one narrator-specific

association – a positive correlation between time and allocentric proportionality – and four coder-specific associations. Because the data for country of birth and country of residence were identical for the reduced set (n=21) the variables were collapsed in table 8.

Set	Pair	P	Q	Avg of P&Q	Rank
Positive	Ethnicity & Counterfactual	.458	.227	.354	5
		.037*	.322	.116	
Negative	Student & Counterfactual	-.230	-.525	-.431	5
		.316	.015*	.051	
Neutral	Time & Allocentric	.524	.431	.498	2
		.015	.051	.022	
	Birth/Resident County & Egocentric	.315	.468	.423	5
		.165	.032*	.056	

Table 8. Significant correlations between NRF proportionality, demographic information, and completion time (n=21), ranked per narrative set according to convergent validity.

** indicates the significant coder in coder-specific associations.*

To uncover whether any of the significant NRF associations were due to the interactions of participant features, mediation and moderation analyses were conducted. Preparations for mediation analyses revealed that none of the recorded participant features met the criteria for mediation (Baron & Kenny, 1986). Likewise, most of the potential moderation relationships did not meet the conditions for moderation analysis. The only interaction to meet said conditions was WPS as a moderator of the effect of neuroticism on participant-level counterfactual proportionality. However, this moderation effect was only near-significant ($R=.357$, $p=.053$).

Chapter 5: Discussion

Due to the large sample size of narrative statements ($n=2296$) the finding that all of the applicable statements correspond to the narrative reference frames provides strong support for the hypothesis that the tripartite NRF model is exhaustive. Because coders were encouraged to identify statements that could not fit into the three categories, it is unlikely that genuinely unique statements were forced into the three categories. Support for this hypothesis demonstrates that the categories in the NRF model are broad enough to accommodate all narrative statements, however, it does not demonstrate that the categories are discrete – i.e. that they do not overlap. In fact, the moderate intercoder reliability may reflect that the categories do indeed overlap and require some degree of subjective appraisal to parse apart, using context and tone as a guide. This interpretation can be verified by demonstrating that coders uniquely utilized context to make coding judgements. Such a demonstration is predicated on the assumption that the training was flawless – otherwise, coder idiosyncrasies could be due to incomplete understanding of coding criteria.

Here in lies the first limitation of the study. Due to the time-consuming nature of coding, no training pilot was run to work out the kinks in the training module. It is now clear that narratives should have been pre-screened by a group of coders, according to narrative qualities, and organized into blocks of increasing complexity. In future iterations, coders should be first trained to code narratives that are well formatted, easily readable, formal, consistent, conscientiously written, and simple, with low intensity and short sentences. Once a high and steady level of judgement accuracy is attained, the coders should be given narratives that are one degree more difficult to code. In this way, competency could be tracked and developed in a stepwise manner, ensuring that coders are not overwhelmed by too many variables. Future iterations of this project should also consider the use of dialogic rather than written feedback on the training homework – this would overcome potential confounds such as incomplete feedback and misinterpretation.

5.1 Mediation analysis: Narrator features and NRFs

Although data that demonstrate the influence of context on coding variability cannot be used to determine, with confidence, whether the narrative categories overlap, such data *can* be used to make sense of the moderate level of intercoder reliability.

Mediation analysis was conducted to test whether narrative quality mediates the effect of the independent variables that significantly predicted P and Q's NRF proportionality.

Nine independent variables met the mediation criteria of Baron and Kenny (1986): fatigue and hostility (affect); neuroticism, withdrawal, openness to experience, and intellect (personality); student status, birth/resident country (demographics); and testing duration. Due to the small sample size ($n=21$), mediation analysis was conducted using a bootstrapping technique simulating 5000 samples⁷.

This analysis revealed 35 significant mediation relationships. Twenty-one associations were set-specific – meaning the mediator and the dependent variable (NRF proportionality) belonged to the same set (see Table 9). Fourteen associations suggested a cross-narrative influence because the mediator and the dependent variable belonged to different sets (see Table 10). 32 of the mediation relationships pertained to Q's coding alone, two pertained to both P and Q's coding, and one pertained to P's coding alone. This suggests that, when making NRF judgements, Q relied much more than P on idiosyncratic differences in narrative quality – specifically: consistency, readability, formality, formatting and conscientious writing style – that resulted from narrator-specific features – namely: intellect, withdrawal, fatigue, hostility, and student status.

⁷ Sobel's, Goodman's, and Aroian's tests were not used because these tests of mediation require much larger sample sizes in order to attain a power of .8 (Fritz & MacKinnon, 2010).

Set	IV	Mediator	DV	Coder
Participant	Intellect	Average Narrative Readability	Allocentric	Q
			Counterfactual	Q
		Positive Narrative Readability	Allocentric	Q
			Counterfactual	Q
		Negative Narrative Consistency	Allocentric	Q
			Counterfactual	Q
		Negative Narrative Conscientiousness	Allocentric	Q
			Counterfactual	Q
		Average Narrative Formality	Counterfactual	Q
		Average Narrative Consistency	Counterfactual	Q
		Positive Narrative Formatting	Allocentric	Q
		Positive Narrative Formatting	Allocentric	Q
			Egocentric	Q
		Negative Narrative Formatting	Allocentric	Q
Negative	Fatigue	Negative Narrative Consistency	Counterfactual	Q
		Negative Narrative Conscientiousness	Counterfactual	Q
		Negative Narrative Formatting	Counterfactual	Q
		Negative Narrative Formatting	Allocentric	P & Q
Positive	Student Status	Negative Narrative Consistency	Counterfactual	Q
		Positive Narrative Formatting	Allocentric	Q
Neutral	Openness to Experience	Neutral Narrative Conscientiousness	Counterfactual	P

Table 9. All significant set-specific mediation effects.

Table 10 highlights that 13 of the 14 cross-narrative mediations pertained to Q's coding, and one pertained to both P and Q's coding. This suggests that Q may have frequently made NRF judgements by using stylistic information derived from separate narratives for each participant. For instance, participants high in intellect tended to produce more readable positive narratives, which in turn influenced Q to code more statements as allocentric in negative narrative conditions. Thus, Q seems to have used qualitative information specific to narrative sets, cross-contextually. Such cross-contextual colouring could have been avoided by randomizing the narrative packages given to the coders – here in lies a second limitation.

Set	IV	Mediator	DV	Coder
Negative	Intellect	Average Narrative Readability	Allocentric	Q
			Counterfactual	Q
		Average Narrative Formality	Counterfactual	Q
		Average Narrative Consistency	Counterfactual	Q
		Positive Narrative Readability	Allocentric	Q
			Counterfactual	Q
		Neutral Narrative Consistency	Allocentric	Q
			Counterfactual	Q
		Neutral Narrative Conscientiousness	Allocentric	Q
		Positive Narrative Formatting	Allocentric	Q
	Fatigue	Positive Narrative Formatting	Allocentric	P & Q
			Egocentric	Q
	Student Status	Positive Narrative Readability	Counterfactual	Q
	Fatigue	Negative Narrative Formatting	Allocentric	Q
Positive				

Table 10. All significant cross-contextual mediation effects.

Together, this suggests that Q used contextual and cross-contextual qualitative information to make NRF judgements, whereas P did not. This difference in coding strategies may provide some explanation for the moderate level of intercoder reliability, but it raises two related questions. Firstly, do the non-mediated correlations between narrator features and NRF proportionality represent a direct influence of said features on NRF proportionality? Secondly, because P's judgements are more often directly influenced by narrator features, do P's judgements more accurately represent participants' true NRF proportionality? Both of these questions can be answered by verifying whether narrator features influence NRF judgements via some factor deeper than narrative quality – namely, narrative structure and content.

5.2 Mediation analysis: Structure, content, and NRFs

To derive narrative structure and content data, the collected narratives were processed using the Linguistic Inquiry and Word Count software (LIWC; Tausczik & Pennebaker, 2010). The software analyses narratives according to 80 dimensions – including psychological and linguistic processes and personal concerns – and outputs a word frequency for each dimension (see Appendix 8 for a full list of LIWC variables). Using the LIWC output, a mediation analysis was conducted on the 21 significant associations between narrator features and NRF proportionality that were not mediated by narrative quality.

Testing the 21 associations yielded ten significant mediation effects for six of the associations (see Table 11) – however, 14 associations remained unmediated (see Table 12). Four of the ten significant mediations pertained to P’s coding alone, five pertained to both P and Q’s coding, and three pertained to Q’s coding alone. This suggests that, like Q, P also used context to inform her NRF judgements, however, rather than relying on narrative quality information, she was more prone to use structural and content information. Note, this is not unique to P in the same way that the use of narrative quality is unique to Q, because Q was also prone to use structural and content information.

Set	IV	Mediator	DV	Coder
Participant Positive	Neuroticism	Average Usage of Space Words	Counterfactual	Q
		Average Usage of Present Tense	Counterfactual	Q
	Neuroticism	Feeling Words in Positive Narrative	Counterfactual	P
		Adverbs in Positive Narrative		P
		Tentative Words in Positive Narrative		P
		Tentative Words in Positive Narrative	Counterfactual	P&Q
		Adverbs in Positive Narrative		P
Neutral	Intellect	Relativity Words in Neutral Narrative	Counterfactual	Q
	Birth/Resident Country	Words Per Sentence in Neutral Narrative	Egocentric	P&Q
		Periods Usage in Neutral Narrative		P&Q

Table 11. Significant content/structure mediation relationships for the 21 associations not mediated by quality (n=21)

5.3 Interpreting NRF mediation

Taken together, these two mediation analyses reveal that Q used more narrative quality information to make NRF judgements. Moreover, Q used said information more frequently than P – this is in line with the results of section 4.2. Alternatively, P used more structure and content information to make NRF judgements – for instance, using feeling words, adverbs, and tentative words to make counterfactual judgements. However, P used such information with relative frequency to Q.

Note, the utilization of narrative quality information to guide NRF coding does not necessarily suggest unfounded coder biases. For instance, because an allocentric narrative is an organization of facts, it is likely to adhere to a standard of consistent quality. Indeed, such a relationship was suggested by the correlations in Table 9. However, reliance on such qualitative information can lead to inaccurate coding. Given the high frequency of quality mediation, and large quantity of quality mediators, it seems as though Q may have

been dependant on quality when making NRF judgements. Thus, it is likely that her coding was more inaccurate than P's coding.

Caution against the reliance on contextual information is somewhat applicable for the use of structural and content information as well. However, reliance on some content is definitionally merited. For instance, in order to make the sort of reflective statements that constitute counterfactual framing, one must use tentative language (words like maybe and perhaps). All of the significant structural elements used by P alone are justifiably unique to the corresponding NRF types, thus there is more reason to believe that her coding was more accurate than Q's coding.

Whether Q's coding actually suffered due to reliance on narrative quality information, and whether P's strategy actually fostered more accurate coding could be verified by comparing P and Q's responses to a list of "correct" responses. The word correct is used lightly here because the derivation of such a list is subject to sources of distortion. For instance, the list could be derived by me, because I possess the fullest knowledge of the NRF model. However, being the author of the theory, I may unknowingly influence the list. Here in lies the third limitation. In order for the accuracy of Q and P's coding to be verified – along with the aptness of their coding strategies – a list of correct responses needs to be coded by a third party – one that has been perfectly trained and is impartial to the data. Thus, the verification of coder accuracy at the present time can only be suggested by the reliance on strategies – this is as far as I can answer the second question posed at the end of section 5.1.

Because narrative quality, content, and structure represent a broad and thorough set of potential mediators, it is likely that the unmediated associations (presented in Table 12) suggest a set of narrator features that directly influence NRF proportionality. An analysis of the unmediated associations can provide insight into the potential clinical utility of NRF proportionality by indicating which patient information can be directly accessed through NRF proportionality. Because such an analysis is peripheral to the primary concerns of this research project, discussion will be held off until section 5.5.

If quality, structure, and content are the general narrative properties that narrator features can influence, and these general narrative properties cannot explain the coders' access to narrator features, then there must be a specific narrative property that is both influenced by narrator features and accessible by the coders. Because the coders were trained to look for NRF proportionality, it is likely that this specific narrative property is NRF proportionality. If this is true, then the fact that coder P accounted for 43% of the associations that were not mediated by narrative quality, structure, and content – as opposed to 7% for coder Q – suggests that P more accurately accessed the true NRF proportionality.

5.4. Sources of moderate intercoder reliability

Thus far, three potential sources behind the moderate intercoder reliability have been identified: unequal training, differing coder strategies, and differing coder accuracy. These sources of disagreement did not result in equal discord on all NRF types. Instead, there was a clear confusion of certain NRF types, as revealed by the intercoder reliability for different combinations of NRF types (see Table 13).

	A, E	A, C	E, C	A, E, O	A, C, O	E, C, O	A, E, C	A, E, C, O
k	.584*	.810*	.480*	.572*	.791*	.467*	.509*	.502*
std.Error	.020	.021	.026	.020	.021	.026	.015	.015
n	1642	915	1283	1661	926	1300	2273	2296

Table 13. Intercoder reliability for different combinations of NRF types. A: allocentric, E: egocentric, C: counterfactual, O: out of narrative.

* $p < .001$

The highest level of agreement concerned allocentric and counterfactual proportionality, $k=.810$ (95% CI, .769 to .851), $p < .001$ – according to the guidelines of Landis & Koch (1977), this represents almost perfect agreement. When the *out of narrative* condition was included, the intercoder reliability dropped slightly to $k=.791$ (95% CI, .750 to .832), $p < .001$. When egocentric proportionality was included, kappa dropped substantially, $k=.502$ (95% CI, .473 to .531), $p < .001$ – this is the reliability when all coding conditions are included. Finally, when allocentric proportionality was removed, kappa dropped to its lowest point, $k=.467$ (95% CI, .416 to .518) $p < .001$. This trend indicates that there was little confusion between allocentric and counterfactual statements, and much confusion

between counterfactual and egocentric statements – the confusion between allocentric and egocentric statements was moderate, $k = .584$.

The substantial confusion between counterfactual and egocentric statements may be due to training, differing coding strategies, or overlapping categories. Training may have contributed to the confusion because counterfactuals were explained as egocentric statements with a reflective twist. This explanation was used because counterfactual statements communicate an opinion (egocentric), formed as an appraisal across events. For instance, the statement *I wish I had gone to the dance with her*, communicates an opinion – that the dance was worth going to. However, this statement also communicates something more, an *ideal*, thereby demonstrating counterfactual comparison. The relationship between allocentric and egocentric statements was similarly explained, as egocentric statements are allocentric statements with a personal twist. Thus, in distinguishing between allocentric and egocentric statements, the coders roughly had to distinguish between fact and opinion, and in separating egocentric from counterfactual statements, coders roughly had to distinguish between opinion and counterfact.

If the NRF categories were understood in these broad terms, the high agreement on allocentric and counterfactual judgements may be due to the ease with which fact and counterfact are distinguished. The moderate agreement on allocentric and egocentric statements may be due to the slight ambiguity between fact and opinion. A *slight* ambiguity exists because the verification of fact requires coders to justify the verifiability and literalness of a statement – this is a task that is *sometimes* difficult (Hermann & Rubenfeld, 1984).

The low agreement when distinguishing egocentric from counterfactual statements may be due to the difficulty in separating opinion from counterfact. This difficulty may exist because both opinions and counterfactuals adhere to a subjunctive mode – in other words, they both express states of unreality. To separate opinion from counterfact, one must recognize that the unreality of opinion is constituted by a personal abstraction from reality, whereas the unreality of counterfact is constituted by a direct connection to fantasy. For a

poorly trained coder, this distinction can seem trivial, subsequently resulting in a conflation of concepts.

Again, if the NRF categories are understood in *broad* terms, the differences between categories are subtle and there is a possibility for categorical overlap. As mentioned at the beginning of section 5, the current data cannot be used to affirm or deny overlap. However, it is important to remember that egocentrism is more than opinion, and counterfactualism is more than appraisal, precisely because these concepts correspond to spatial frames. Framing a scene according to one's position (egocentric) is vastly different from framing a scene according to a hypothetical scene (counterfactual). Thus, the confusion between egocentric and counterfactual statements is likely not the result of conceptual overlap. Rather, it is likely a feature of heuristic coding based on broad conceptual terms derived from insufficient training.

Support for the notion that heuristic coding is responsible for the egocentric and counterfactual confusion is suggested by the discrepancy in the use of contextual information. As indicated by the mediation analyses, contextual data was most relied upon when judging statements to be counterfactual (54%), and least relied upon when judging statements to be egocentric (17%). If egocentric statements are understood as opinions, they should be straightforward to identify, and often would not require contextual information. Likewise, if counterfactual statements are understood as appraisals, it would be difficult to cleanly identify them as unique from opinions, thus much contextual information would be needed to guide the judgement.

In sum, the moderate level of intercoder reliability is largely due to confusion between egocentric and counterfactual statements. The erratic learning curve (Figure 3) suggests that the coders had insufficient training, and coder reliance on narrative qualities suggests that the insufficient training resulted in heuristic rather than deep coding. This effect is greater for coder Q, as her learning curve indicated a decrease in understanding before official coding started and because she relied most on narrative qualities to make quicker judgements. This difference in understanding and coding strategies between P and Q likely lead to further coder disagreement.

Because a moderate level of agreement was maintained despite all of these setbacks, this project suggests that the existence of narrative reference frames should be taken seriously. Future research can utilize the narrative data collected in this study with a set of coders more rigorously trained. If NRFs are a real construct, a refined replication would yield a strong level of agreement on the same narrative data. Moreover, such a replication would provide a basis for more robust connections between NRF proportionality and the participant data collected.

For the time being, connections can be drawn between the unmediated participant data and the NRF proportionality for the 21 participants that P and Q agreed on more than average. As mentioned in section 4.4, the intercoder reliability for these 21 participants represents substantial agreement according to the guidelines of Landis and Koch (1977), with $k=.615$ (95% CI, .572 to .658), $p<.001$. Thus, the unmediated connections made between NRFs and narrator features have a good chance of being meaningful.

5.5 Interpreting non-mediated associations with NRFs

As demonstrated in Table 12, the unmediated associations between narrator features and NRF proportionality consist of seven coder-specific associations— six of which are specific to P – and seven narrator-specific associations. Because these associations are not mediated by structure, content, or quality, both the coder and narrator-specific associations are interpreted as revealing a real association between proportionality and narrator features. Rather than suggesting coder biases, unmediated coder-specific associations suggest coder-specific insight into proportionality. This is because it is unlikely that proportionality and narrator features would significantly associate by chance, and there seems to be no specific contextual information that might have indirectly influenced proportionality judgements.

The *narrator-specific* ranking (1, 2, or 3) carries a new meaning in these associations. narrator-specificity may indicate a more pervasive association between features and proportionality, or it may indicate convergent understanding of statement types by coders. Both of these interpretations suggest that narrator-specificity arises when narrator features

result in the production of prototypical NRF types that are easily identifiable. Alternately, coder-specific ranking (4, or 5) likely indicates coder insight into the atypical use of NRFs. This notion is consistent with the fact that most of the unmediated coder-specific associations pertain to P, the coder who most deeply processed statements.

Set	Pair	Coder P	Coder Q	Avg P&Q	Rank
Positive	Volatility & Allocentric	r= -.511 p=.018	r= -.400 p= .073	r= -.464 p=.034	2
	Fatigue & Egocentric	r= -.545 p=.016	r= -.670 p=.002	r= -.637 p=.003	1
	Hostility & Allocentric	r=.433 p=.064	r=.611 p=.005	r=.545 p=.016	2
	Hostility & Egocentric	r= -.444 p= .057	r= -.423 p= .071	r= -.457 p= .049	3
	Hostility & Counterfactual	r= -.051 p=.837	r= -.462 p= .046*	r= -.290 p=.228	5
	Ethnicity & Counterfactual	.458 .037*	.227 .322	.354 .116	5
	Withdrawal & Counterfactual	r=.404 p=.069	r=.176 p=.072	r=.438 p=.047	3
Negative	Fatigue & Egocentric	r= -.412 p=.080	r= -.457 p= .049	r= -.514 p= .024	2
	Joviality & Egocentric	r= -.461 p=.047*	r= -.317 p= .186	r= -.418 p= .075	5
Neutral	WPS (verbal) & Egocentric	r=.476 p=.029*	r=.129 p=.577	r=.327 p=.147	5
	WPS (verbal) & Counterfactual	r= -.521 p=.015*	r= -.084 p=.718	r= -.318 p=.161	5
	Time & Allocentric	.524 .015	.431 .051	.498 .022	2
	Joviality & Egocentric	r= -.459 p=.048*	r= -.246 p=.310	r= -.374 p=.114	5
Participant	Raven's & Counterfactual	r= -.517 p=.016*	r= -.225 p=.326	r= -.381 p=.088	5

Table 12. All significant unmediated associations between narrator features and NRFs ranked per narrative set according to convergent validity (n=21) for all associations except with hostility, (n=19).

** indicates the significant coder in coder-specific associations.*

Only two associations occur in more than one narrative condition: the narrator-specific negative correlation between fatigue and egocentric proportionality (in positive and negative narratives), and the coder-specific (P) negative correlation between joviality and egocentric proportionality (in neutral narratives and across conditions). The reason that the significant association between fatigue and egocentrism was not apparent in the neutral narrative condition is because it was masked by a general decrease in egocentric proportionality in neutral narratives, as revealed by descriptive statistics.

Averaging P and Q's judgements for the whole group ($n=21$) revealed that egocentric statements constituted 48% of positive narratives, 50% of negative narratives, and only 42% of neutral narratives. Conversely, for the top ten fatigued participants, egocentric statements constituted 38% of positive narratives, 42% of negative narratives, and 40% of neutral narratives. Thus, although there was a slight reduction in egocentric statements in neutral narratives for fatigued participants, there was a low baseline for egocentric statements in the average population that was similar to the average egocentric proportionality for fatigued participants (40%). This low baseline was probably due to the fact that the neutral condition does not arouse individuals to personally colour their recollections.

Similarly, fatigued individuals likely produced less egocentric statements in general because they lacked the enthusiasm necessary to invest extra cognitive resources in egocentric elaboration. Support for this idea comes from research demonstrating that sleep deprivation decreases rats abilities to use egocentric spatial information in navigation (Le Marec, Beaulieu & Godbout, 2001). Moreover, just as in our sample, fatigue does not effect allocentric processing in rats.

Averaging P and Q's judgements, the average set of narrative reference frames is constituted primarily by egocentric statements (47%), then allocentric statements (34%), and least by counterfactuals (18%). In the top 11 jovial people, allocentric statements were most common (43.5%), then egocentric (39%), and counterfactual statements were least common (17%). This unique proportionality was most striking in the neutral conditions: allocentric (52.5%), egocentric (30.5%), counterfactual (17%). Because this proportionality is associated with *joviality*, support is garnered for my third hypothesis, that adaptive emotionality is associated with predominantly allocentric framing and least associated with counterfactual framing. This proportionality also explains why there was a negative correlation between joviality and egocentric proportionality at the participant level (across conditions). The reason why this proportionality was not reflected in a significant positive correlation between allocentric proportion and joviality is likely due to the larger standard deviation in allocentric attributions – allocentric $SD=21.5$, egocentric $SD=18$.

Hostility – which was significantly correlated with all three NRF types, without mediation – produced the same proportionality distribution as joviality in positive narrative conditions. The top seven (out of 19 applicable) hostile participants produced 52% allocentric, 35% egocentric, and 13% counterfactual statements. This is at odds with my third hypothesis, because increased hostility does not represent adaptive emotionality. This effect may exist because hostile people were likely less willing to commit the extra cognitive resources necessary to produce egocentric statements - again, due to a lack of task enthusiasm. This explanation saves my hypothesis, but it complicates its clinical applicability by implying that therapists must ensure that narrator enthusiasm remains high when working to increase allocentric framing. This amendment to the NRF theory sits well with work by Jaak Panksepp that suggests that hypoactivity of the brain's enthusiasm circuit is responsible for depression (Panksepp, Solms, Schläpfer, & Coenen, 2014).

Further evidence for the proportionality hypothesis comes from the unmediated associations between the two aspects of neuroticism (volatility and withdrawal) and NRF proportionality. Participants that scored low on the volatility dimension tended to produce more allocentric statements. Because the facets that best describe volatility are instability, neg-calmness, hostility, neg-tranquillity, and neg-impulse control (DeYoung, Quilty & Peterson, 2007) – features that characterise emotional disorder – the finding that volatile people produce fewer allocentric statements sits well with my theory. Note, although hostility is a facet of the volatility aspect, it does not necessarily follow that volatile people were not enthusiastic participants. This is because the volatile group was not characterized by a hostile *mood*.

The facets that best describe withdrawal are neg-happiness, depression, vulnerability, anxiety, and self-consciousness (DeYoung, Quilty & Peterson, 2007) – again, these are features that characterise poor emotional well-being. Participants that scored high on withdrawal tended to produce more counterfactuals. Rather than shifting proportionality from egocentric to counterfactual, these participants produced a higher percentage of counterfactuals (+ 4%) by producing fewer allocentric statements. This connection

between allocentric framing reduction, counterfactual framing increase, and emotional disturbance is in line with my third hypothesis.

Increased fluid IQ and verbal IQ were significantly associated with a reduction in counterfactual proportionality (in participant and neutral sets, respectively). When the data were analysed closely, it was revealed that two participants were causing this effect (as well as the association between verbal IQ and egocentric statements). Both participants were more than 4 standard deviations below the mean fluid IQ and verbal IQ. When these two participants were removed from the analysis, verbal IQ and fluid IQ were no longer significant predictors of NRF proportionality. It is likely that these participants guessed the answers to the Raven's and WPS tests, given that their narratives maintained a high level of coherence.

Ethnicity was positively correlated with counterfactual proportionality in positive narratives. This association suggested that Asian participants ($n=2$) produced more counterfactual statements. However, the meaningfulness of this association is tenuous because it was caused by a strange distribution of NRF types for one of the two Asian participants – the participant produced no allocentric statements in their positive narrative. When this participant was removed from the analysis, the association was no longer significant. Likewise, the association between completion time and allocentric proportionality on neutral narratives was contingent on two participants – one of which left the survey open for longer than a day. Because the timing module only provided data for the whole survey, no meaningful explanations can be derived for this effect. When these participants were excluded from the analysis, the association was no longer significant.

5.6 NRF influence on emotion

Support for the NRF theory of narrative influence was derived from the finding that adaptive affect (i.e. joviality) was associated with predominantly allocentric framing, and maladaptive emotional dispositions (i.e. volatility and withdrawal) were associated with decrements in allocentric framing. Again, these connections are meaningful because they

seem to be unmediated and hence cannot be explained by coder strategies or biases. Although less powerful, support for NRFs emotional influence was also garnered in section 4.4 of the results.

For instance, for all of the 14 significant narrator-specific associations with personality and affect, $r > .44$ (based on the average of P and Q's judgements). For eight of these associations, $r > .5$, and for two of these associations, $r > .6$. According to the conventions put forth by Cohen, most (57%) of the significant associations between NRF proportionality and personality/affect have a large effect size. According to guidelines derived from 380 meta-analytic studies (Hemphill, 2003), all of the 14 significant associations have an effect size comparable to the upper third of correlation coefficients in psychological research.

In order to ensure that these large effect sizes were not due to the effect of clustering outliers manipulating the least squares approximation, the data were plotted and the associations were re-analysed through L1 robust regressions using MM-estimation to estimate absolute error. These analyses suggested that two associations were not in fact significant: neuroticism and counterfactual proportionality in positive narratives, and withdrawal and counterfactual proportionality in negative narratives. The analysis affirmed the effect sizes and the significance of the 12 other associations. In fact, r increased for most of the associations after robust regression. For instance, the association between volatility and counterfactual proportionality at the participant level increased from $r = .445$ ($p < .05$), to $r = .880$, ($p < .000$).

These associations suggest that neuroticism and its corresponding aspects are all positively correlated with counterfactual proportionality, across sets and ranks, and negatively correlated with allocentric proportionality. Because neuroticism is significantly associated with anxiety and depression (Kotov, Gamez, Schmidt, & Watson, 2010), this finding lends some support to the idea that reduced allocentric framing is associated with decreased emotional well-being. However, this assumes that the NRF proportionality for neurotic participants is mediated by anxiety and depression, and there is no way of testing this assumption with the current data. Future iterations of this project

can investigate this connection by using a clinical population or by screening participants with depression and anxiety measures.

The results in section 4.4 also suggest that openness to experience and its corresponding aspect are positively correlated with allocentric proportionality, and negatively correlated with counterfactual proportionality, across sets and ranks. Considering that a combination of high openness to experience and low neuroticism significantly predicts subjective well-being (Garcia, 2008), this could indicate an association between well-being and NRF proportionality. The absence of a subjective well-being measure is a limitation of this study, and future replications can provide a more detailed and accurate account of the influence of NRF proportionality by incorporating such measures.

Although some support was found for the narrative influence hypothesis, this support was largely indirect. Most support came from the relationship between NRF proportionality and maladaptive personality profiles - namely, high neuroticism and its associated aspects. This relationship is treated as support because neuroticism has been shown to be associated with maladaptive emotional profiles (Kotov et al. , 2010). Consistent with this research, neuroticism and its associated aspects are associated with maladaptive emotionality in this sample (see Table 14). However, the significant associations between NRF proportionality and neuroticism were not mediated or moderated by these associated maladaptive affects.

	General Negative Affect	Fear	Sadness	Guilt	Joviality	Self- assurance	Serenity	Surprise
Neuroticism	$r = .498$ $p = .030$	$r = .471$ $p = .042$	$r = .491$ $p = .033$	$r = .484$ $p = .036$			$r = -.527$ $p = .021$	$r = -.473$ $p = .041$
Withdrawal	$r = .630$ $p = .004$	$r = .500$ $p = .029$	$r = .688$ $p = .001$	$r = .644$ $p = .003$	$r = -.480$ $p = .036$	$r = -.570$ $p = .011$	$r = -.537$ $p = .018$	

Table 14. Significant associations between neuroticism, its aspects, and affect. Note, volatility did not correlate significantly with any affect dimensions.

How come a direct relationship between affect and NRF proportionality did not emerge, and why didn't affect mediate the relationship between neuroticism and NRF proportionality? It could be that the NRF model does not concern the sort of affect measured by the PANAS-X. As outlined in the theoretical basis of NRF theory (section 2.2), narrative reference frames were derived to explain emotionality in clinical settings.

This sort of emotionality is much more long-term and stable than recent mood, which is what the PANAS-X measures. There is something qualitatively different between sadness and depression, and the design of this experiment neglected this difference. Future iterations of this research may surpass this limitation by utilizing measures of more long-term emotionality, such as clinical or well-being scales.

Alternatively, it may be the case that the NRF model does not apply to emotional disorders, but rather, *personality* disorders. Considering that only neuroticism and openness were found to significantly correlate with NRF proportionality, this explanation is doubtful. However, this possibility may be tested by replicating this experiment using a measure of maladaptive personality, such as the Personality Inventory for the DSM-5. Regardless of whether an effect is found in the long-term emotionality replication, or the personality disorder replication, some sort of clinical utility will be maintained in either case.

Chapter 6: Closing remarks

The results of this project allude to the utility of the NRF model and subsequently demand further investigation. Because the exhaustiveness of the tripartite model was established, and coding agreement was justifiably moderate, there is reason to believe that the NRF model is reliable. Moreover, because support was found for the relationship between NRF proportionality and emotional well-being, the applicability of this model to clinical settings may be feasible.

Note, even if the proportionality hypothesis is proven to be incorrect, the NRF model maintains clinical utility. As mentioned at the end of section 2.3, counterfactual statements represent the highest degree of personalization in narrative – evidence for this point comes from the fact that counterfactual proportionality correlated with the most narrator features. As such, clinicians can derive maximal insight into the mind of patients by eliciting narratives that contain a high proportion of counterfactuals.

Before any clinical implications of the NRF model can be taken seriously, the causal relationship between emotion and narrative-frame proportionality must be investigated. It may be that emotional dispositions foster specific NRF profiles which have no influence on subsequent emotions. In such a case, the NRF model has little to offer clinicians. Alternatively, if emotional dispositions foster framing-profiles which in turn effect emotional dispositions, there will be grounds for clinical innovation using the NRF model. For instance, therapies could be developed which influence allocentric framing more directly, and subsequently improve emotional well-being more efficaciously. Moreover, the NRF model could be used to develop less fallible diagnostic techniques which utilize NRF disproportion to identify developing or concealed mental illnesses.

Stringent replication and subsequent experimental elaboration may reveal the validity and position of narrative reference frames among other psychological constructs. From there, the applicability of NRFs can be investigated across domains.

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Appendix 1: Discussion of narrative-based therapies

The structure of narrative-based therapies

The techniques that comprise narrative-based therapies are founded on theoretical models describing the relationship between emotion and narrative. Although there are dozens of such models, they can be reduced to two general categories: reconstructive models, and elaborative models.

Reconstructive models assert that emotions are contingent on the *structure* of narratives. Specifically, these models posit that emotional well-being is attained by developing narratives that are meaningful (Bender, Bauckham, & Norris, 1999; McAdams, 1996; Wong & Watt, 1991), coherent and well organized (Baerger & McAdams, 1999; Lieberman & Tobin, 1983; Pennebaker, 1993; Wong & Watt, 1991; Wortham, 1999), accurate, realistic and concrete (Abramson, Metalsky, & Alloy, 1998; Brockmeier & Carbaugh, 2001; De Fina & Georgakopoulou, 2012), complex and multifaceted (Angus, Levitt, & Hardtke, 1999; Combs & Freedman, 2004; Fuvish, 2011; McAdams, 1996), or positive and optimistic (Bender, Bauckham, & Norris, 1999; Billings & Moos, 1985; Boothe & von Wyl, 2004). Each of these structures can affect emotions via unique avenues.

Events that are reorganized into *meaningful* narrative structures influence individuals to value themselves and the things that make up their lives (Bender, Bauckham, & Norris, 1999). *Coherently* structured narratives foreground certain perspectives and directions that can inspire and prepare individuals to redirect their lives (Butler, 1963; Dimaggio & Semerari, 2004; Wortham, 1999). Narratives that are restructured in an *accurate and realistic* way can break a feedback loop of inaccurate and maladaptive evaluations (Beck, 1967). Narrative *complexification* interconnects narrators with themselves, their families, communities, and cultures, providing insight into that web of connections (Frattaroli, 2006; Fuvish, 2011). Finally, *optimistically* structured narratives enable narrators to see problems as resolvable which may promote more positive emotions (Folkman et al., 1986; Vezina & Bourque, 1984; Billings & Moos, 1985).

Elaborative models assert that thoroughly articulating – rather than reconstructing – one's narratives has a profound effect on emotions. The theories that substantiate elaborative models all emphasize that emotional well-being is achieved through some sort of unique conditions produced by narrative expression.

Agency theorists posit that the self-reflection and self-regulation required in the articulation of narrative may produce feelings of mastery and increased self-efficacy that can facilitate emotional change (Buitelaar, 2014; Lepore, Greenberg, Bruno, & Smyth, 2002). According to *disinhibition* theories, on the other hand, narrative expression relieves the tension associated with undisclosed emotional experiences, resulting in positive and stable emotions (Boothe & von Wyl, 2004) – this is similar to the Freudian idea of catharsis (cf. Guinagh, 1987).

Social theories highlight that narrative disclosure connects individuals and motivates them to be more expressive, ultimately facilitating beneficial validation and support networks (Bender, Bauckham, & Norris, 1999; Pennebaker & Graybeal, 2001). *Formal emoting* theories posit that emotion is affected by narrative because storytelling provides a means to practice expressing emotions (Bender, Bauckham, & Norris, 1999), with such practice resulting in more adaptive emotion processing. *Narration experience* theories suggest that the process of narration facilitates positive emotions because it is intrinsically rewarding by affording flow⁸ experiences (Perry, 2010).

Because there are two predominant models that describe the relationship between emotion and narrative, narrative therapies fall into three categories: those solely based on either reconstructive or elaborative models, and those based on *both* reconstructive and elaborative models. Although narrative restructuring necessarily involves an expression, and narrative elaboration involves an initial restructuring of what is to be expressed, therapeutic processes can be distinguished on the basis of the techniques that they employ. For instance, therapies that are constituted predominantly by techniques of narrative scrutiny and subsequent narrative alteration adhere to the reconstructive model of narrative therapy.

⁸ A pleasant state in which time seems to slow and storied content is effortlessly produced (Csikszentmihalyi, 1990).

Narrative-based therapies consisting of techniques that adhere chiefly to the elaborative conception of narrative influence may be referred to as elaborative narrative therapies. In *drama therapy*, theatre techniques – such as dance, improvisation and role play – enable patients to ritualize their experiences both verbally and non-verbally (Jennings, 1998). By maintaining an aesthetic distance when enacting their narratives, patients foster a cathartic and corrective emotional experience (Duggan & Grainger, 1997). It is the processes of embodying narration to deeply explore experiences that is the principal intervention in drama therapy, thus the therapeutic nature of drama therapy is contingent on an elaborative rather than a reconstructive formulation.

Life narration therapies consist of verbal recollection of patient life experiences in response to thematic or temporal questioning. In guided autobiography, for instance, patients reflect on and write about specific questions pertaining to their past experiences, share their responses, and receive feedback from other patients (Fagerstrom, 2013). Similarly, in reminiscence therapy, patients recollect significant events from across their life spectrum in response to general or specific prompts which elicit positive reflection or informative reminiscing (Hsieh & Wang, 2003). In life narration therapies, the therapist provokes the deep recollection of narratives that may be beneficial to the patient, but rather than work with the patient to re-story the past or the self, the focus of said therapies is narrative expression.

Therapeutic writing consists of regular textual narration of unexpressed thoughts and feelings concerning past experiences (Bolton, 2004; Kerner & Fitzpatrick, 2007). In journal therapy, patients use reflective or process writing to communicate their experiences, emotions, and identities – techniques include list making, letter writing, and free writing (Bolton, 2004). Alternatively, in expressive writing therapy, patients write about their deepest thoughts and feelings concerning their most traumatic experiences, without feedback from, or interaction with, a therapist (Lenhoff, 2011; Pennebaker & Chung, 2007). Although certain textual structures are more conducive to emotional improvement, namely coherence and emotional expression (Pennebaker & Seagal, 1999) – the structures that reconstructive narrative therapists pursue – the process of these therapies is decidedly elaborative.

Reconstructive narrative therapies are narrative-based therapies consisting of techniques that adhere chiefly to the reconstructive conception of narrative influence. In *narrative cognitive behavioural therapy* (NCBT) – a distinct third wave movement of cognitive behavioural therapy – therapists work with patients to develop positive narratives, explore alternative perspectives of experiences, foreground unique experiences, and uncover the significance of experiences (Rhodes, 2013). Although the patient must articulate past experiences throughout the process, such articulation is a precursor to the actual therapeutic techniques, which are entirely concerned with the modification of narrative representations.

In *narrative psychiatry*, a therapist works with a patient to deconstruct and reinterpret negative experiences, and reinforce positive experiences – in conjunction with standard psychiatric practices (Lewis, 2011). Within this therapy, expression is not free, but rather it is scaffolded in order to enable specific narrative restructuring practices. For instance, patients start with stories of success in order to facilitate feelings of mastery that enable them to dissociate their identities from problem experiences. This, in turn, enables the patient to start to develop stories of strength and meaning (Hamkins, 2014). Thus, narrative psychiatry integrates the reconstructive model into psychiatric practice.

In *psychoanalysis*, a therapist works with a patient to develop a new life narrative that has fewer contradictions and is more comprehensive (Schafer, 1983). Because psychoanalysis was the first therapy to identify the emotional benefits of the cathartic method, or abreaction, (Guinagh, 1987), it could be reasoned that psychoanalysis is in fact an elaborative narrative therapy. However, progress in psychoanalysis is predicated on the notion of narrative coherence. Specifically, psychoanalysts posit that the integration of unconscious content into conscious narratives is the cornerstone of recovery (Phillips, 1999). Thus, the processes of psychoanalysis concerns the complexification of representation, rather than thorough expression.

In *cognitive therapy* – in its purest form (c.f. Beck, 1967) – therapists work with patients to restructure inaccurate narratives and schemas to be more realistic and positive. In this way, both past narratives and real-time narration are subject to restructuring. Consider the

following example from Blackburn & Davidson (1995). The automatic thought: “*My financial affairs are in a mess. I shall not find another home in time.*” would be scrutinized and restructured into: “*there are some difficulties because I need to find another house to buy in two months. But I am catastrophising...*” This focus on restructuring both narration and narrative embodies the reconstructive model.

Therapies that integrate expression and representation are hereafter referred to as dual-model narrative therapies. In *narrative therapy*, therapists work with patients to dissociate their identities from problematic events, elaborate and contextualize their experiences, and uncover alternate story-lines (White, 2007). These practices constitute the initial phases of narrative therapy, and together they amount to reconstructive manipulation. Once a coherent and complex functional narrative emerges, patients present their newly structured life stories to an audience (White, 2007). It is this act of pure deliberate retelling that incorporates the elaborative model into narrative therapy.

In *poetry therapy*, therapists inspire expression through the introduction of relevant poems and literature, and patients express feelings and experiences through creative writing and elaborate emotions using rituals, metaphors, and storytelling. This therapy is reconstructive in that the therapist brings narrative themes to the fore using existing poetry and works with the patient to derive insight and a sense of order, and to complexify identity using patient generated poems (Mazza, 1999). The elaborative aspect of poetry therapy is captured by the deep expression through creative release in composing poems based on experiences.

In *psychodrama therapy*, patients enact recent and past experiences with the therapist acting as a probing director providing opportunities to creatively revise scenes (Blatner, 2000). The process enables patients to re-experience original feelings, gain insight into experiences, experience catharsis, and ultimately achieve reintegration (Karp, 1998). Embodied narration is utilized to harness the potential emotional benefits associated with multi-level expression, thus indicating adherence to the elaborative model. The guidance of the therapist, in elaborating scenes and uncovering connections in search of functional and adaptive narratives, indicates an adherence to the reconstructive model.

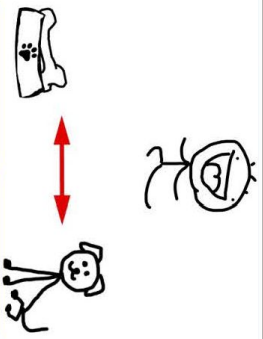
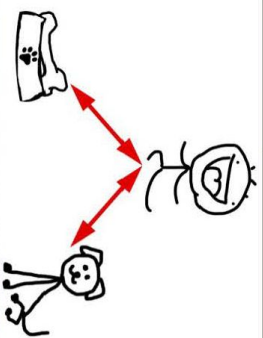
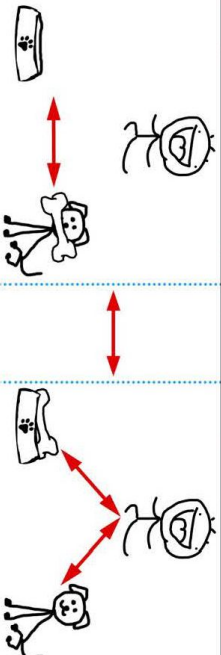



The efficacy of narrative-based therapies

The therapies within the three camps have been shown to be significantly effective at decreasing the symptoms of depression and anxiety – with the exception of NCBT and narrative psychiatry, which have yet to be investigated.

In the elaborative camp, depression and anxiety symptoms are significantly reduced through journal therapy (Campbell, 1992; Macnab, Beckett, Cohen-Park, & Sheckter, 1998), expressive writing therapy (Graf, 2004), guided autobiography (Bohlmeijer, Smit, & Cuijpers, 2003), reminiscence therapy (Chaing et al., 2010), and drama therapy (Anari, Ddadsetan & Sedghpour, 2009; Mackay, Gold & Gold, 1987). In the reconstructive camp, both psychoanalysis (de Maat, 2013) and cognitive therapy (Clark, 1995; Dobson, 1989) have been demonstrated to significantly reduce symptoms of anxiety and depression. Finally, in the the dual model camp, psychodrama (Carbonell & Parteleno-Barehmi, 1999), poetry therapy (Mohammadian et al, 2011), and narrative therapy (Rahmani & Moheb, 2010; Vromans & Scheitzer, 2011) all significantly reduce depression and anxiety symptoms. The therapies of all three camps have large effect sizes ($d > 0.8$) for decreasing depression and anxiety symptoms (Bohlmeijer et al., 2003; Free, Oei & Sanders, 1991; Smit et al., 2012; Vromans, 2008).

Thus, despite utilizing narrative in fundamentally different ways, elaborative, reconstructive, and dual model therapies are similarly effective at treating emotional disorders. The fact that elaborative and reconstructive therapies produce similar results and can be integrated without summative results (as seen in dual model therapies), suggests that the efficacy of these therapies is contingent on a shared underlying construct. Uncovering said construct would provide a better understanding of how narrative influences emotion, and would lay the foundation for more effective diagnosis and therapy methods. The purpose of this thesis is to verify the existence of a narrative construct – narrative frames of reference – that may underlie the effectiveness of elaborative and reconstructive narrative therapies. If verified, the place of narrative frames of reference in therapy can be investigated in future studies.

Statements in narrative recollections can be classified as one of three types:

	Allocentric	Egocentric	Counterfactual
Definition	Informational content is construed as independent of the speaker's worldview ¹	Informational content is construed in terms of the speaker's worldview	Informational content is construed in relation to a hypothetical standard
Related Concepts	Fact	Opinion	Appraisal
	Reality	Appearance	Fantasy
	Objectivity	Subjectivity	Idealism
Samples	<ul style="list-style-type: none"> - As I ate my sandwich, he watched me - I felt nervous as he stared at me - Frank told me that I should get a job 	<ul style="list-style-type: none"> - Steven is a good painter - He paints with his soul unleashed - I think he is my most gifted friend 	<ul style="list-style-type: none"> - I should have given her a bigger tip - I was happy with how it turned out - I am sorry for yelling at my mother
Contextual Sample	The other clerks had at least 1 year of prep. I was the least experienced one.	The paper was full of computations and derivations. It was a nightmare.	I broke my collarbone, three ribs and my wrist. It could have been a lot worse.
Common Types	External: My brother was an Engineer Internal: I felt sad all morning Relational: Steve is Anne's husband	Evaluative: Tuna is disgusting Metaphorical: Tuna is sea sewage Perspectival: I think tuna are ugly too	Specific: I was worried that she wouldn't consider my arguments valid General: I wish I could learn from my mistakes Appraising: He was too excitable
Identifiers	<ul style="list-style-type: none"> - Literal, verifiable, and impersonal - Cold hard statement 	<ul style="list-style-type: none"> - Figurative, evaluative, and personal - Statement with a personal twist 	<ul style="list-style-type: none"> - Comparative, imaginative, and transcendent - A higher order statement of appraisal (of the events in question)
Depiction			
Visual Analogy			

¹ A frame of reference that guides top-down perception according to past experiences (including cultural exposure), values, and personality

**note: these three types apply to recollections, not statements about the recollections (e.g. this story is easy to remember)

**note: classifications are made based on context and word choice

Coding:

0: out of narrative

1: allocentric

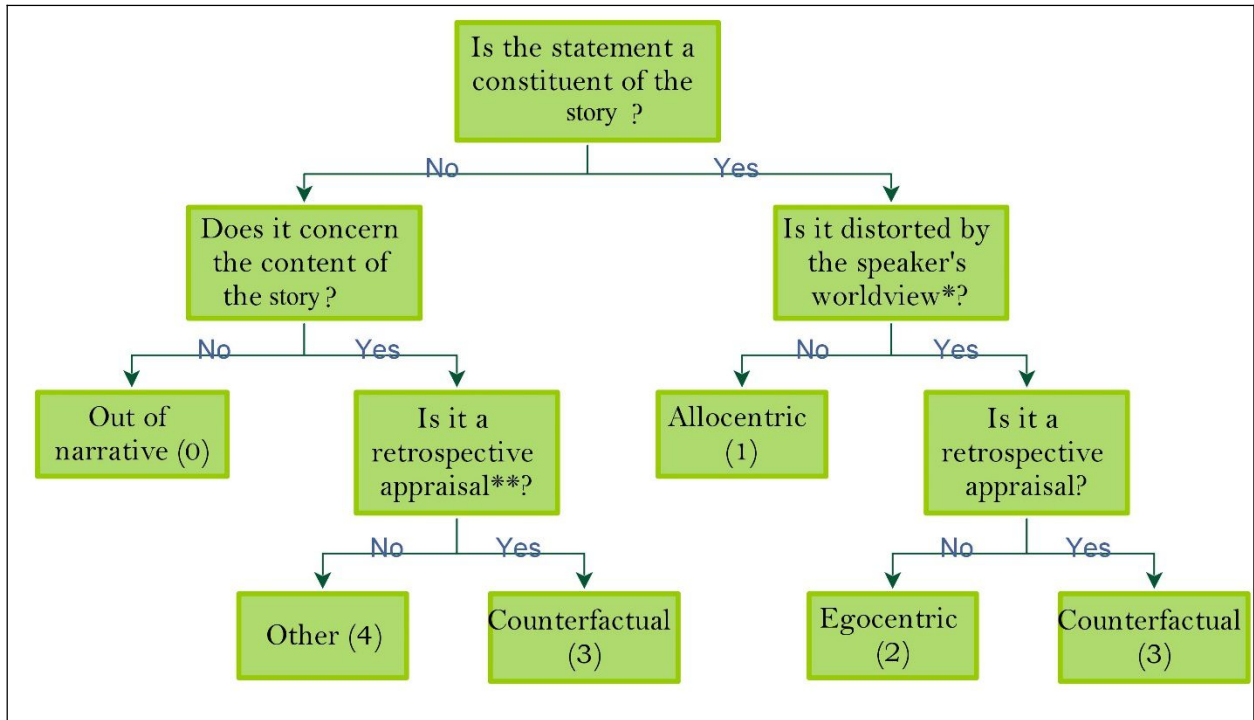
2: egocentric

3: counterfactual

4: in narrative but not 1, 2, or 3

Appendix 2: Concept table used during training

Appendix 3: Concept flowchart used during training



*DISTORTIONS BY WORLDVIEW: the content of the statement is coloured by the participant

- Figures of Speech (e.g. novel and common metaphors)
- Value Judgements/Attributions (e.g. trait appraisals)
- Opinions (e.g. preferences, beliefs, guesses)
- Veiled Remarks (e.g. rhetorical questions, scare quotes, typeface emphasis)
- Exaggeration/hyperbole (e.g. unjustified quantity attribution)
- Personalized attributions (e.g. pet names)

**RETROSPECTIVE APPRAISAL: a reflective statement about the event after the event

- Choice/state appraisal (e.g. "I regret...", "I was the happiest")
- Event comparison (e.g. "it was the best night of my life")
- Expectation (e.g. "he should've...", "she didn't even...")
- Desire (e.g. "I wish that...")

Appendix 4: NRF test administered to coders

Short Answer:

- 1) The main difference between allocentric and egocentric statements is...
- 2) What sets counterfactual statements apart from the other two types of statements?
- 3) A statement contains fact, opinion, and reflection. How do you code it and why?

Coding: *Categorize the statement and justify your categorization*

- 4) When I was a kid, my brother played pranks on me every single night.
- 5) It was almost midnight when he called my cellphone.
- 6) His leg was bouncing up and down like he was on crack.
- 7) My computer got a virus and I lost all of the work I had done.
- 8) He finally showed up, pretending like he didn't care.
- 9) She didn't ask me if I was hurt or if I had my own reasons for the breakup.
- 10) They didn't have to tell me I was crazy.

Conversion: *Code the following statements and then convert the statement into one of the two other types of narrative statements (via deletion and addition of words). Note, your conversions should result in one of each statement type (no repeats).*

11) I could have made food for the party
 Type:
 New Type:

12) She made it seem like I was a complete fool
 Type:
 New Type:

13) I broke many dishes that day.
 Type:
 New Type:

Appendix 5: Higher-level concept clarification 1

You are coding to verify and (potentially identify) storytelling styles. The literature across domains – linguistic, philosophical, and neuroscientific – seems to suggest that there are three “storytelling styles”, and that this list is exhaustive. However, this argument has been implicit and to my knowledge has never been verified. This is our project.

The categorical terms I have taught you come from the neuropsychology of perception. Each refers to a mode of representing information in the world. I have chosen these terms because they are scientifically grounded and are the most likely mechanism underlying storytelling styles – this is because a story-telling style is a mode of representing information in the world. The neuropsychological modes of representation may be understood as follows:

- 1) Allocentric representations construe information independent of the speakers perspective
- 2) Egocentric representations construe information in terms of the speakers perspective
- 3) Counterfactual representations construe information in terms of connections between egocentric and allocentric representations

These definitions should guide your intuitions about the coding categories I have described to you and will expound in this document.

Story Parameters

We are prompting individuals to recall memories. An example of the prompt that is used is:

Please take a moment to imagine a positive event from any time in your past. This does not need to be the most positive event from your past – but it can be. When you are ready, recall the memory you chose

Note, their instructions are very basic. They are not asked to “describe” a memory, because this implicates fact regurgitation. The prompt essentially says: be your life’s storyteller. Now, there are several dimensions to a storyteller, but these dimensions are only applicable when a story is being told. The participant may comment on the task or come out of the process of story-telling. These sorts of statements are not relevant to our thesis (that there are 3 story telling styles) because such statements are not part of the story telling process – they are part of the communication process in general (beyond our scope). When the participant comes out of the story telling process, we code the statement with a 0.

For this to be applicable, you need to be aware of what counts as a story. We will consider a personal story to be a recollection of an isolated or an extended event. This event may span minutes to years and may stretch all the way up to the present. The recollection process may include reflections, insights and connections that develop the story but do not communicate (point to) anything specific that happened. Because these are part of the story telling process, such reflexive devices are relevant to our thesis.

Story-telling Styles

You can conceive of the storytelling styles in terms of caricatures that would predominantly speak in each style.

Allocentric:

Robot Rob is like a machine. When he tells you about his day, he tells you things literally and impersonally. Every statement that he makes dryly points to something in the world or in his head. He tells you things without humour, aspirations, opinions, evaluations, or any sort of personal colouring. He is a walking/talking encyclopaedia of things that he has experienced.

Egocentric:

Drama Queen Derek is... well... a drama queen. When he tells you about his day, there's always a little bit of Derek in there. His statements point to things in the world or in his head in a flamboyant way. He tells you things in innuendoes, dramatizations, figures of speech, and opinions. He's not here to tell you what happened, he's here to tell you what he saw and how he saw it. He is the doodles in the encyclopaedia.

Counterfactual:

Meditative Mike is a pensive man. When he tells you about his day, he does not point to things that happened, he points at their meaning. He places things in perspective with insights, desires, comparisons, lessons, and higher-order appraisals. He has his eye on more than stimuli in the world and in his head. He is the scribbled comments in the margins of the encyclopaedia.

A typical story is a combination of Rob, Derek and Mike, at the paragraph level, and at the sentence level. Robot Rob can start a story and Drama Queen Derek can chime in (and overpower) with a sassy remark, or Meditative Mike can chime (and overpower) in with an insight, but Robot Rob can never chime in and overpower the other two (because what he has to say is subsumed in the statements of the others). Likewise, Drama Queen Derek cannot overpower Meditative Mike because what Meditative Mike has to say is based on Drama Queen Derek's input.

Appendix 6: Higher-level concept clarification 2

Counterfactual statements are the sort of reflexive statements that constitute a reminiscing style of recollection. Paul T. P Wong has developed taxonomy of reminiscence which may be useful for catching counterfactuals. Note, these are all terms and examples that Wong uses, but they are perfectly applicable to our understanding of counterfactuals. The terms he uses are a little too vague to confer strong understanding, but taken with the examples the following may fill in the gaps on what is meant by “reflexive reminiscence”.

Integrative Reminiscence: past experiences are endowed with meaning and significance as a result of interpretation of those events in light of current knowledge, perspective, and concerns (Webster & Young, 1988; Yang & Rehm, 1993)

- Accepting one’s past as significant and worthwhile
 - “I am satisfied with the way things have turned out”
- Accepting negative past experiences and integrating them with the present
 - “I believe that this hardship in my childhood has made me a better person”
- Reconciling reality with an ideal:
 - “I always wanted to be a writer, but I discovered that I just don’t have the talent, so I became an editor”

Instrumental Reminiscence:

- Review of goals and plans
 - “...I had to leave home and move to the city to study, but I’ll tell you, it was worth it”
- Drawing from past experience to solve present problems
 - “the lessons I learned in those years have really helped me in trying to live on my old age pension”
- Recalling how one coped with past difficulties
 - “I think what helped my progress the most was my state of mind” [this is discovered causality]

Obsessive Reminiscence:

- Confessing guilt, bitterness, or disappointment
 - “This terrible thing would never have happened had I stayed with him”

Egocentric statements are referred to by some authors as stylistic or performative gestures. These statements encode current affective processes and the teller’s stance towards what is being said. Thus, these statements organize what happened according to the teller’s schema of the world.

Allocentric statements are bare-threaded autobiographical facts that provide the *who*, *what*, *when*, *where* and *why* (direct causality) of the recollection. Whereas egocentric statements are related to the psychological concepts of reconstruction and schemas, allocentric statements are related to the psychological concepts of storage and retrieval.

Appendix 7: Narrative quality coding chart

Please appraise each narrative according to the following criteria using a Likert scale (1-5). The table indicates the extreme positions (1 and 5), whereas 2, 3 and 4 are the graded intermediary positions.

Formatting
On the whole, does the narrative follow the rules of punctuation, grammar and spelling? 1. Not at all 5. Completely
Readability
How easily can you derive meaning from the sentences? 1. Extremely difficult 5. No difficulty at all
Complexity
How much information does the author try to communicate in each sentence? 1. Very little 5. Very much
Sentence Length
On the whole, how long are the sentences? 1. Very short 5. Very long
Formality
Does the speaker use a formal voice/style in narrating? 1. Not at all 5. Completely
Consistency
Is the narrative inconsistent? i.e. does the author jump topics and tenses? 1. Very much 5. Very little
Intensity
On the whole, how intense is the narrative? 1. Very dull 5. Very Intense
Conscientiousness
Does the author seem to take the writing seriously? 1. Not at all 5. Completely

Appendix 8: LIWC software variables

Linguistic Processes	Psychological Processes	Current Concerns
Word count (mean)	Social processes	Work
Words/sentence	Family	Achievement
Dictionary words	Friends	Leisure
Words>6 letters	Humans	Home
Total function words	Affective processes	Money
Total pronouns	Positive emotion	Religion
Personal pronouns	Negative emotion	Death
Category	Anxiety	Spoken categories
1st pers singular	Anger	Assent
1st pers plural	Sadness	Nonfluencies
2nd person	Cognitive processes	Fillers
3rd pers singular	Insight	Punctuation
3rd pers plural	Causation	Total Punctuation
Impersonal pronouns	Discrepancy	Periods
Articles	Tentative	Commas
Common verbs	Certainty	Colons
Auxiliary verbs	Inhibition	Semicolons
Past tense	Inclusive	Question marks
Present tense	Exclusive	Exclamation marks
Future tense	Perceptual processes	Dashes
Adverbs	See	Quotation marks
Prepositions	Hear	Apostrophes
Conjunctions	Feel	Parentheses
Negations	Biological processes	Other punctuation
Quantifiers	Body	
Numbers	Health	
Swear words	Category	
	Sexual	
	Ingestion	
	Relativity	
	Motion	
	Space	
	Time	

80 LIWC variables. The software provides frequency values for each variable.