Prospection in Social Anxiety Disorder

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Abstract

Social anxiety disorder is a disorder that affects millions of adults worldwide. Past research in the field has shown differences in the generation of episodic detail when analyzing positive autobiographical memories involving social situations of those who are highly socially anxious versus those who are less socially anxious, with those with high social anxiety showing a reduction in the generation of episodic detail when retrieving such memories. However, there has been little research done in the area of prospection, defined as the generation of mental representations of possible futures, and social anxiety disorder. Research has established that memory and prospection engage similar brain regions and based on this link, we hypothesized that those with social anxiety would display less episodic detail in their future imaginings of social scenarios than healthy controls. To test this hypothesis, behavioral data (n = 22 for SAD, n = 24 for healthy controls) was gathered through audiotaped interviews of participants describing future scenarios (with either positive or negative valence) and then coded for amount and type of details given in the description. Contrary to the original hypotheses, there was no significant effect of valence by condition, but a potentially novel finding of a large significant main effect of valence was found, with both socially anxious and healthy control participants generating more episodic details for positive events.

Introduction

Social anxiety disorder (SAD), which is also referred to as social phobia, is a disorder characterized by feelings of unease, anxiety, fear and worry when interacting with other people and oftentimes is coupled with avoidance of numerous types of social situations (American Psychiatric Association, 2013). According to the *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edition, for one to be diagnosed with SAD, the social or performance fear, anxiety and avoidance must be persistent, lasting 6 months or more (American Psychiatric Association, 2013). The type of social situations that induce anxiety in individuals with SAD can be varied but the social anxiety and distress can occur in virtually any kind of social setting (American Psychiatric Association, 2013). Consequently, SAD has the potential to significantly influence one's day-to-day life, including one's work and academic life. For example, research suggests that those with SAD have an increased risk of dropping out of school early and may earn wages as much as 10% lower than non-clinical populations (Katzelnick et al., 2001; Van Ameringen et al., 2003).

SAD has been estimated to affect millions of adults in America. Data from a large scale epidemiological survey showed that close to 1 in 8 adult Americans (12.1% of the population) have suffered from SAD at some point in their lifetime (Kessler et al., 2005). Additionally, it estimated that in a given year, approximately 6.8% of adult Americans will suffer from SAD (Kessler, Chiu, Demler, & Walters, 2005). This places SAD as the 4th most common mental condition in America for lifetime prevalence and as the 2nd most common mental condition in America for 12-month prevalence (Kessler, Chiu, Demler, & Walters, 2005; Kessler et al., 2005).

With SAD affecting such a notable amount of the national populace, research into the psychological mechanisms associated with SAD is vital for gaining better understanding of the disorder and building a foundation for developing a more holistic and effective approach to treatment. One evolving area of SAD research involves the retrieval of autobiographical memories in those with SAD. Autobiographical memories refer to memories that an individual is remembering about their own experiences. Research has suggested evidence for differences in the frequency of episodic details in the retrieval of autobiographical memories and their valence (the positivity or negativity of the memories) when comparing highly socially anxious individuals with less socially anxious individuals (D. Moscovitch, Gavric, Merrifield, Bielak & M. Moscovitch., 2011). Episodic details are defined as specific, personal details directly pertaining to the memory that is recalled (such as details about the weather) as opposed to generalized, broad and factual details (such as the statement, "Denver is the capital of Colorado"), which are referred to as semantic details. The aforementioned study demonstrated that highly socially anxious participants, when asked to reflect on autobiographical memories, retrieved an unbalanced ratio of negative-to-positive memories. Specifically, highly socially anxious participants' endorsed memories (which are memories they admitted to experiencing) were more heavily weighted towards negative memories, while low socially anxious participants endorsed a more balanced of positive and negative memories (D. Moscovitch, Gavric, Merrifield, Bielak & M. Moscovitch., 2011). Additionally, highly socially anxious participants were shown to reflect on positive memories with significantly less episodic detail than those who were less socially anxious. Those who were highly socially anxious also experienced greater negative emotion when asked to recall the negative autobiographical experiences. Another study noted the importance of negative autobiographical memories in the identity of those with SAD,

who rated scenarios cued by socially anxious phrases (like “humiliation” and embarrassment”) to be more central to their identity than healthy controls (O’Toole, Watson, Rosenberg, & Berntsen, 2016). This concept is further reinforced by the results of another research study in which participants with SAD were interviewed and 96% of them were able to recall specific negative autobiographical events involving social situations that they themselves believed were related to the formations of their self-image (Hackmann, Clark, & McManus, 2000).

Thus, it appears that there is a bias towards greater recall of negative memories and high levels of negative emotion and self-identification associated with negative autobiographical social memories in those with SAD. These negative memories arguably play a significant role in the creation and maintenance of one’s identity in SAD potentially by leading to the development of excessive negative conceptions about their social self that are activated in future social situations (Hackmann, Clark, & McManus, 2000). The finding that SAD may also be associated with lower levels of episodic details in retrieved memories (at least when recalling positive social memories) suggests that the neural networks for encoding or retrieving social memories may be altered or functions differently in individuals with SAD.

If there are differences in the retrieval of autobiographical memories in individuals with SAD compared to non-socially anxious individuals, there may also be notable differences when it comes to prospection. Prospection is a term used to describe the generation of mental representations of potential future scenarios - in other words, thinking about future events. Evidence gathered from neuroimaging, lesion, and developmental studies has shown that memory and prospection engage similar brain regions, including the left hippocampus and various posterior visuospatial brain regions (Addis, Wong, & Schacter, 2007; Zheng, Luo, & Yu, 2014). One example demonstrating how they are linked include the findings that amnesic

patients often exhibit deficits both in memory and prospection (Hassabis, Kumaran, Vann, & Maguire, 2007; Kwan, Carson, Addis, & Rosenbaum, 2010; Race, Keane, & Verfaellie, 2012; Rosenbaum et al., 2005; Tulving, 1985). While the neural substrates for memory and prospection are not identical, their significant overlap led us to the hypothesis that if SAD affects autobiographical memory retrieval, it plausibly could have influences on prospection as well. If differences in prospection are found in those with SAD compared to healthy controls, it may be due to differences in activation patterns of particular brains regions, such as the left hippocampus or the medial prefrontal cortex and lateral temporal cortices, when imagining these future scenarios. Such brain regions have been suggested to be involved in *both* autobiographical memory and prospection, as demonstrated by the results of numerous fMRI and EEG experiments (Hsu & Sonuga-Barke, 2016; Spreng, Mar & Kim, 2009; Zheng, Luo, & Yu, 2014).

Although past research has been conducted in the area of SAD and autobiographical memories, there are currently no known studies on SAD and prospection. However, research has been done on prospection within various other mental disorders, including major depressive disorder (MDD) depression and generalized anxiety disorder (GAD). Research suggests that as many as 50% of patients with a primary anxiety disorder may meet the criteria for another anxiety disorder (Mennin, Heimberg, & Jack, 2000). One study demonstrated that one-quarter of those with SAD also met criteria for a diagnosis of GAD (Mennin, Heimberg, & Jack, 2000). With a notable comorbidity between the two disorders, there may be commonalities between how prospection is affected within GAD and within SAD. A recent study found that when asking participants to imagine possible future scenarios involving objects, people and places they were familiar with, healthy controls generated a significant amount of more episodic detail than GAD participants, at least when asked to imagine the scenarios multiple times (Wu et al., 2015). Both

groups reported detail generation to be easier with repeated imaginings generally, but the GAD group did not report that it was easier to generate details when asked to imagine *positive* events multiple times. Additionally, GAD participants rated potential negative events to be more plausible than the healthy controls did (Wu et al., 2015). These results suggest there is a negativity bias in future thinking in GAD and that GAD is associated with a deficit in the frequency of episodic details in prospection. Although GAD is not the same disorder as SAD, there may be some correspondence in the way those with such anxiety disorders think about the future. Much of anxiety stems from negative thinking about future events and the subsequent worry about having to experience such negative or uncertain events.

As noted, major depressive disorder (MDD) has also been shown to commonly co-occur with SAD. In one large scale epidemiological study, results showed that MDDs were found in 1 in 5 patients with SAD (Ohayon & Schatzberg, 2010). Evidence supports the claim that depression negatively influences the function of prospection as well. One experiment demonstrated that those who currently exhibit or have exhibited depressive symptoms in the past are vulnerable to disruption in executive function, particularly when imagining the future (Addis, Hach, & Tippett, 2016). Such participants showed a significant reduction in the specificity and amount of details given when asked to imagine future scenarios. Given the comorbidity of SAD and depression, prospection may be affected in similar ways in SAD.

Thus, for this research project, the central research question is whether those with SAD display less episodic detail in their prospections about the future than their non-socially anxious counterparts. Drawing on previous research involving SAD and autobiographical memories, it is hypothesized that SAD participants will imagine positive future events with less episodic detail. Furthermore, it is hypothesized that those with social anxiety will have greater emotional

reactions to imagining future negative social situations than healthy control participants. The results of exploring such hypotheses will contribute to a greater understanding of SAD. In addition, this project links to a future project in which we will be investigating differences in neural activation during prospection in those with SAD compared to healthy controls. Through a better understanding of SAD and the psychological mechanisms associated with the disorder, more efficient psychological treatments for those with SAD can be developed.

Methods

Please note that this study is a part of a larger grant-funded study titled *The Mechanisms of Spontaneous Thought*, conducted by Dr. Joanna Arch and Dr. Jessica Andrews-Hanna at the University of Colorado Boulder.

Participants

Participants (n = 46) were recruited from the greater Boulder community and the University of Colorado at Boulder campus. The mean age of the participants was 23.67 (SD = 4.78, Median = 22.00, Range = 18.00-35.00). The sample was 63% female (29/46), 34.8% male (16/46), and 2.2% gender queer (1/46). Regarding race/ethnicity, the sample was 80.43% (37/46) Caucasian and non-Latino and 7.39% (8/46) racial or ethnic minorities. One participant preferred not to respond when asked for their race. There were no significant differences between the healthy control and socially anxious groups on age (p = .71), race (p = .95) or gender (p = .54).

To recruit participants, study flyers were placed around campus and throughout the Boulder community, such as in coffee shops, restaurants, local libraries, bus stops, “the Hill,” and 29th Street mall. Recruitment also included electronic advertisements, such as ads displayed through the CU Boulder Today electronic newspaper and Craigslist. Interested participants were

invited to email the research team and the research team sent interested participants a link to the Pre-Screening questionnaire.

In order to be eligible, participants had to be right-handed and between the ages of 18 and 40 with normal or corrected to normal vision. This age group was selected because it is appropriate for neuroimaging research, which benefits from a narrower age range. Right handedness was an eligibility criteria because the MRI study involved language and motor responses, and it has been shown that left-handed individuals have different patterns of brain activity than right-handed individuals during such tasks. Normal or corrected to normal vision was an eligibility criteria because the experience sampling questionnaires include sliding scales. Participants also had to be able to read and write in English and own a personal smartphone with internet and texting capabilities because they were asked to complete questionnaires using their smartphone on days leading up to the scanning and interview experiment. Additional exclusion criteria on the pre-screening included the presence of neurological diseases, physical disabilities that may make undergoing an MRI scan difficult, pregnancy, past or current history of depression, drug abuse or an eating disorder, marijuana use exceeding 4 days a week, and current and regular (daily) use of psychiatric medication or other medications that impact stress responses (e.g., anxiolytics, pain medications).

Finally, participants were evaluated to determine their eligibility specifically for the healthy control (n = 24) or SAD (n = 22) groups. To be eligible for the healthy control group, they had to indicate that they did not have any DSM 5 disorders, including anxiety and mood disorders (see *Diagnostic Screening*, below). In order for a participant to be eligible for the SAD group, they had to meet DSM 5 criteria for social anxiety disorder, though co-occurring anxiety

disorders were permitted. However, the SAD group could not meet eligibility for current mood, psychotic, eating, or substance use disorders.

This study was approved by the University of Colorado IRB. Informed consent was obtained from all participants.

Compensation

Participants were given up to $90 in compensation for their participation, including diagnostic interviews ($5), questionnaires ($5), behavioral and MRI sessions ($55 if the feedback task was not included and $65 if the feedback task was included), and the use of a smartphone app over 10-14 days ($15). Participants did not receive payment for the study if they did not come to their scheduled behavioral and MRI session. Participants who did not meet eligibility as determined by the diagnostic interview were given a $5 Amazon gift card. All eligible participants were compensated in cash at the end of the experimental session.

Screening Measures

Pre-Screening

After emailing the research team, participants were sent a link to complete the Pre-Screening questionnaire administered via RedCap, a secure web application used for building and managing online surveys and databases.

Diagnostic Screening

Once participants completed the Pre-Screening questionnaire and were deemed potentially eligible, they were assessed for their final eligibility through a phone interview conducted by clinical psychology doctoral students or a post-BA research assistant with extensive diagnostic interview training and experience. The SAD module of the Anxiety

Disorders Interview Schedule for DSM 5 (Brown and Barlow, 2014) was administered, a gold standard for diagnosing SAD, and the MINI, a widely validated, briefer diagnostic interview for DSM 5 that assesses the presence of additional psychiatric disorders (Sheehan, 2014).

Procedures

Setting

The fMRI scanning and interview portion of the study took place at the Intermountain Neuroimaging Consortium at the Center for Innovation and Creativity in Boulder, CO. The ratings used to determine the top 4 most positive and negative scenarios (see *Prospection Task,* below) were collected during the scan, and the prospection interview evaluated here occurred post-scan.

Prospection Task

In the prospection task administered in the fMRI scanner, participants were presented with cues (18 positive and 18 negative cues, which were picked based on the participant's previous valence and personal relevance ratings of the scenarios) for specific social situations (see *Appendix*). Participants were asked to silently generate a plausible *future* scenario involving the given cue and reflect on how it would feel to experience the situation. Afterwards, they were asked, "How did the imagined event make you feel?" and were given the opportunity to answer on a sliding scale from 0 to 1, with 0 = the most negative and 1 = the most positive. These ratings were used to determine which cues were selected for the coding analysis (see below).

Prospection Interview

Outside of the scanner, a prospection interview reflecting on the 36 cues of approximately 45 minutes was conducted. This interview required subjects to describe in 30

seconds (per cue) what they had imagined for each cue and scenario they were given during the prospection task in the scanner in as much detail as possible. Participants were video and audio recorded throughout the interview.

Transcription of Interviews

The 30-second interviews on each cue (36 for each participant, for 18 minutes of interview each) were transcribed electronically into a word document for each participant, with each specific cue corresponding to the number of the audio file.

Coding

The 4 most positive and 4 most negative cues for each participant, based on participants' own valence ratings taken in the scanner at the end of the Prospection Task, were used for the coding analysis. In the case that subjects stated they did not remember what they had imagined in the scanner during a specific selected cue, the next most positive or negative-rated cue was used.

The coding manual was based on the September 2016 version of the Adapted Autobiographical Interview Scoring Manual (Addis, Wong & Schacter, 2008). Coder reliability was established through the completion of reliability scenarios sent by Dr. Donna Addis. After the completion of the coding of these scenarios, the scores were sent back to Dr. Donna Addis and she ran an intraclass correlation between the scores sent in and scores from her laboratory members that were trained in the coding technique. Cronbach's alpha (a measure of internal consistency or how closely related a set of items are as a group) was .96 for internal details and .86 for external details between the two groups of scores.

For each imagined event coded, the main cued event was noted and all details pertaining to the main event were coded as 'internal' and were indicative of episodic details (see example in

the *Appendix*). The main event was considered the event directly relating to the cue and restricted in time, no more than a few hours in duration. If participants discussed more than one time-restricted event (for example, if a participant described multiple events on different days while on vacation), the time-restricted event described in most detail was chosen. All other details that did not directly pertain to the main event were coded as 'external' (such as general facts or information about past events) and were indicative of semantic details.

The scenario was then coded into segments, with a score of 1 point given to each detail. Each piece of information given by the interviewee (such as observations, facts, statements or thoughts) was coded as a detail. For example, the description "old brown hat" would be given a score of 3 details, while "hat" would only be given a score of 1 detail. Words describing amounts (such as "a little" or "a few") were given an additional detail score. Other words like "really" or "so" were also given an additional detail score (for example, "She was really upset" would earn the score of 2 details, versus 1 detail score for "She was upset").

Internal details consisted of 5 categories:

1. *Event details*: Event details describe the unfolding of the story. They include occurrences in the event, also include who was there (1 point per name/person up to a maximum of 5), reactions/emotions in others, the weather, and one's clothing.
2. *Place details*: Details involving localization in space, such as countries, cities, streets, geographical markers, rooms or locations in a room.
3. *Time details:* Details consisting of the year, season, month, date, time of the week or clock time.
4. *Perceptual details*: Auditory, olfactory, tactile/pain, spatial, visual or taste details.

5. *Emotion/Thought details*: Any detail involving the mental state of the subject during the event, including thoughts and emotions. These details were further scored for valence (positive, neutral or negative).

External details consisted of 5 categories:

1. *Semantic details*: General knowledge or facts.
2. *Repetitions*: Details that has already been given in the scenario previously.
3. *Other details*: Metacognitive statements, inferences and other statements that contain information but do not relate to the main event or fit into any other external category.
4. *External episodic details:* Details given about an event that occurred before or after the main event.
5. *External generic events/routines*: Details that refer to repeated or routine events.

An example of a scored scenario can be found in the *Appendix*.

For purposes of the current analyses, we focused solely on the amount of internal details generated overall, the amount of external details generated overall, and emotion/thought details.

Results

Our main area of interest was the amount of internal details generated per scenario for each participant. The four most positive and the four most negative scenario scores were separately averaged for each participant, so each participant had two sets of averages: one for the most positive cues and one for the most negative cues. Additionally, the amount of positive, negative and external details were averaged for each participant for each the positive and negative cues.

A two-way repeated measures ANOVA was conducted with the between-subjects factor of group (healthy control vs. socially-anxious) and within-subjects factors of valence (positive vs. negative) in order to evaluate the effects of both group and valence, and their interaction, on the amount of internal details generated by each subject.

There was a significant and very large main effect of valence, $F(1,44) = 31.86$, $p < 0.01$, partial $eta^2 = 0.42$, such that participants generated more internal details per scenario (see Figure 1) in response to positive scenarios ($M = 12.42$, $SD = 3.91$) than negative scenarios ($M = 9.67$, $SD = 3.06$). However, while the mean amount of internal details generated per scenario (see Figure 2) by the healthy control group ($M = 11.46$, $SD = 3.25$) was higher than the socially anxious group ($M = 10.60$, $SD = 2.93$), the valence by group interaction was non-significant, $F(1,44) = 0.59$, $p = 0.45$, partial $eta^2 = 0.01$.

We next evaluated the influence of group on level of positive emotion/thought details, $F(1,44) = 0.07$, $p = 0.80$, partial $eta^2 = 0.00$, negative emotion/thought details, $F(1,44) = .21$, $p = 0.65$, partial $eta^2 = 0.01$, and external details, $F(1,44) = 1.5$, $p = 0.23$, partial $eta^2 = 0.03$, but none of the valence by group interactions were significant.

In summary, there was a significant and very large main effect of valence on the generation of internal details but the valence by group interaction was non-significant for the generation of internal details, positive thought/emotion details, negative thought/emotion details, and external details.

Discussion

This study represents the first study of prospection in adults with SAD compared to healthy controls. Specifically, this study evaluated behavioral measures of prospection and the amount of episodic and semantic details generated through the process of prospection through

interview audio data, particularly through the amount of episodic internal details generated by participants directly pertaining to the main event being described.

The central hypothesis of this study was that SAD participants would imagine future events with less episodic detail, as measured through the amount of internal details generated in each scenario. This hypothesis was influenced by past research in the field of SAD and autobiographical memories, as well as research in the field of prospection and depression and prospection and GAD (Addis, Hach, & Tippett, 2016; D. Moscovitch, Gavric, Merrifield, Bielak & M. Moscovitch., 2011; Wu et al., 2015). It was further hypothesized that SAD participants would have greater negative emotional reactions to imagining future negative social situations than healthy control participants. Overall, the results of this study do not support the original hypotheses. While the amount of internal episodic details generated by the healthy control group was on average greater than the socially anxious group, these differences were not significant. Furthermore, there were no significant effects of the valence by group interaction on the amount of negative emotion/thought details generated.

These results contrast with previous research findings in related areas. Past research in SAD and autobiographical memory retrieval has indicated that SAD may be associated with lower levels of episodic detail in the retrieval of positive autobiographical memories (D. Moscovitch, Gavric, Merrifield, Bielak & M. Moscovitch., 2011). Such findings supported the idea that SAD participants would also display lower levels of episodic detail in their future positively cued prospections, given the link between memory and prospection (Addis, Wong, & Schacter, 2007; Hsu & Sonuga-Barke, 2016). Furthermore, given the comorbidity of both depression and GAD and SAD, these results also contrast with the findings of research studies involving depression and prospection and GAD and prospection, where both depression and

GAD were found to be associated with deficits in the frequency of episodic details generated when imagining future events (Addis, Hach, & Tippett, 2016; Wu et al., 2015). It cannot be fully determined if the non-significant valence by group interaction is a replicable finding or if this is the result of study limitations (as discussed below), particularly the limited sample size. There is a possibility that while the process of retrieving autobiographical memories in SAD is altered, the process of prospection is not altered to a significant extent in SAD, making it unique from depression and GAD when it comes to prospection. In order to generate more conclusive evidence, more research needs to be done in the area of SAD and its influences on prospection.

While there was no significance of the valence by group interaction, there was a significant and very large main effect of valence on the amount of internal details generated, with both SAD and healthy control participants generating more internal details for positive cues versus negative cues. Due to the limited amount of literature on prospection involving the specific autobiographical interview model and manual that was used in this study, this may be a novel finding relating to the process of prospection in general. Such results would appear to indicate that it is more difficult to think of negative future social events in greater amount of episodic detail than positive future social events, in general. Perhaps such a finding relates to the purpose and function of prospection. It may be that imagining future negative events serves a purpose of averting oneself from making choices that would eventually lead to the realization of such negative future events. The inherent discomfort and distress experienced while imagining these kinds of events may be the reason why it is harder to imagine such events in greater amounts of detail. In contrast, imagining positive future events is more likely to induce feelings of pleasure and happiness. Imagining positive events thus may inherently be rewarding and therefore it is easier to produce more detailed and vivid scenarios while imagining such events.

The strong feelings associated with negative events may be enough to serve the function of leading to further aversive behavior, and these strong feelings may occur without the need for further detail generation. Such ideas remain speculations and further research in this area needs to be done to directly test these possibilities.

It is important to note that this study did have limitations. First of all, due to constraints on time, there was only one coder. Although the coder established inter-rater reliability with other trained coders on the overall coding scheme (through initial reliability materials), we did not establish inter-rater reliability on the scores of the actual data used for the study. It remains possible that there could have been scoring drift. Another limitation is the sample size. The sample size was largely limited by the use of the fMRI scanner in the larger study this study is part of, as grant funds could only support the scanning of a pre-specified number of participants. Thus, it is possible that the non-significant valence by group interaction for internal details may have been statistically significant with a larger sample size. Additionally, coding only the top 4 most positive and top 4 most negative scenarios could have potentially altered the results. In the future, one could code all 36 of the scenarios and determine if doing so would yield more comprehensive results. Finally, several subjects (n = 4) appeared to not be very motivated during the interview portion of the study as they did not speak for the entire 30 seconds and gave very brief descriptions of the scenarios they imagined. This is possibly influenced by the fact that the interview occurred as the last task of a multi-hour session, after the scanning task and other tasks (which were part of the larger study). The lack of motivation of some of the participants could have potentially altered the accuracy of the results, as some of the participants' given descriptions during the interview likely did not completely portray the level of detail of the previously imagined scenarios.

Conclusion

Contrary to the original hypotheses, the main effect of valence by group interaction was not significant for the amount of episodic internal details generated on average for each cue. The main effects of the valence by group interaction on the amount of positive emotion/thought details, negative emotion/thought details and external details generated were also non-significant. The main effect of valence was found to be both significant and very large, with both SAD and healthy control participants generating more internal details for positively cued events than negatively cued events. Such a finding was unexpected and potentially novel, providing implications for further research in the area of prospection.

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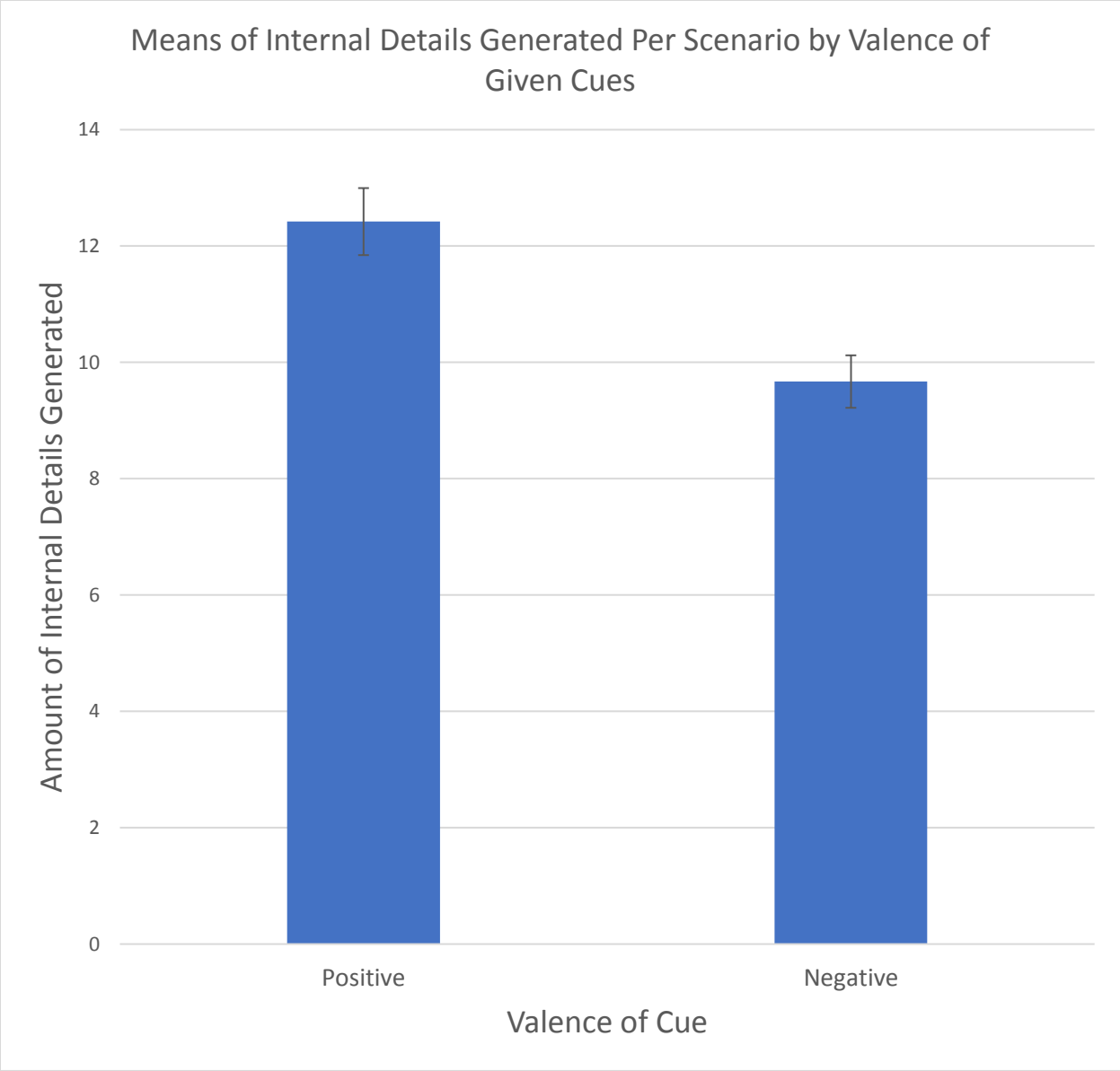


Figure 1: Mean amount of internal details generated per scenario by cue valence for all participants (n = 46). Participants generated more internal details, on average, for cues of positive valence (M = 12.42, SD = 3.91, SE = 0.58) versus negative valence (M = 9.67, SD = 3.06, SE = 0.45). The main effect of valence was found to be large and statistically significant, $F(1,44) = 31.86$, $p < 0.01$, partial $eta^2 = 0.42$. This effect was seen in both the healthy control and socially anxious groups.

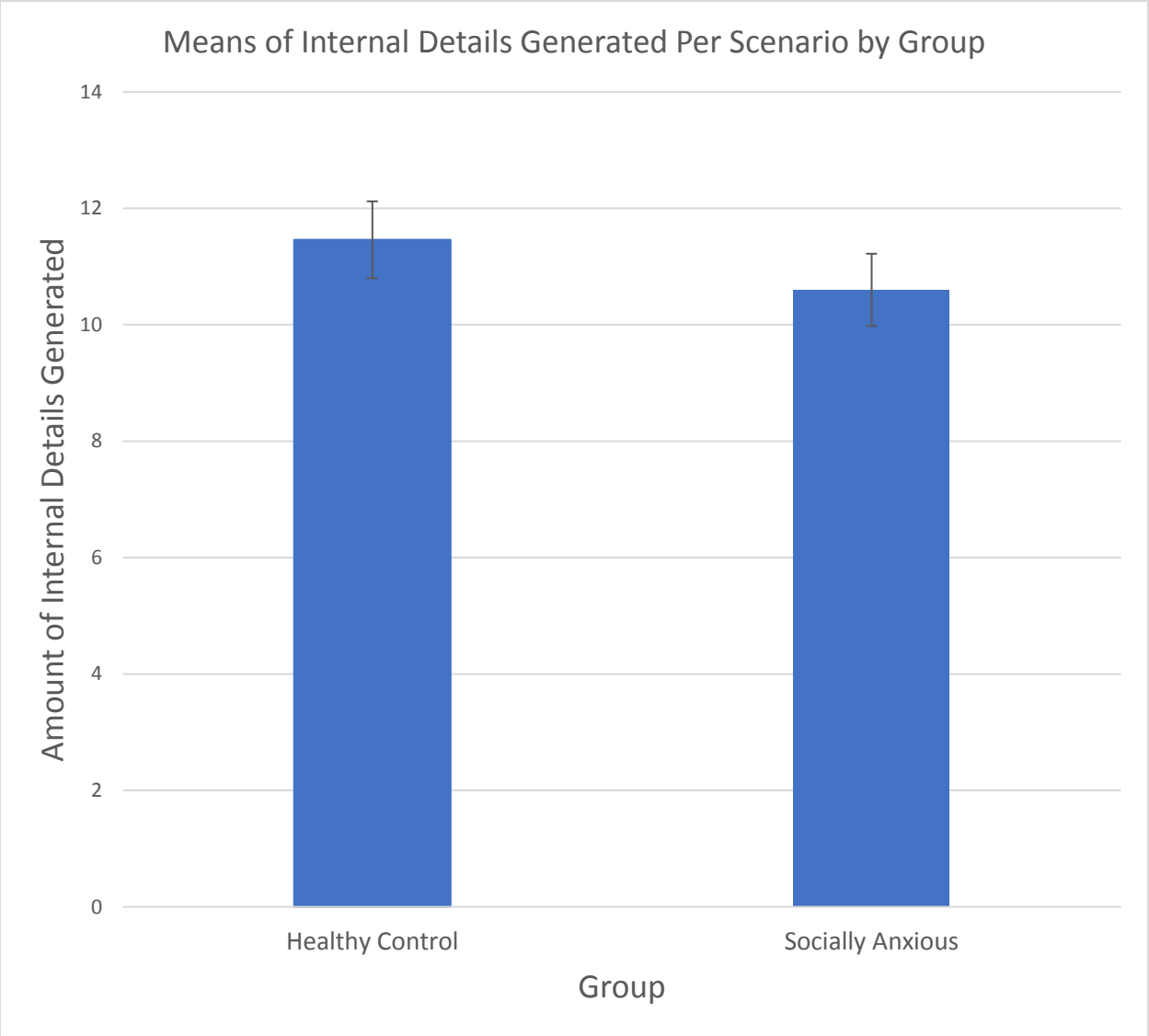


Figure 2: Mean amount of internal details generated per scenario by group (n = 24 for the healthy control group, n = 22 for the socially anxious group). The mean amount of internal details generated per scenario by the healthy control group (M = 11.46, SD = 3.25, SE = 0.66) was higher than the socially anxious group (M = 10.60, SD = 2.93, SE = 0.62). However, the differences in the generation of internal details between the two groups is not significant, as the valence by group interaction was found to be non-significant, F(1,44) = 0.59, p = 0.45, partial eta^2 = 0.01.

Appendix A

List of Prospection Cues

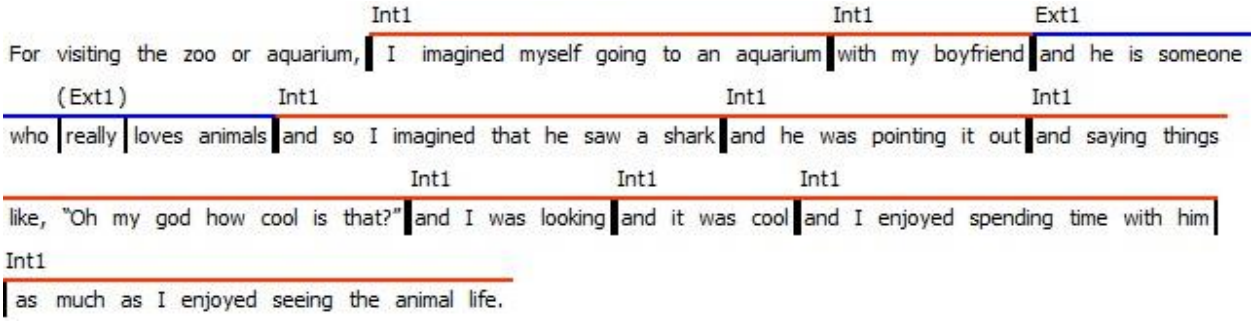
1. Doing a good deed
2. A major holiday celebration
3. Birthday party
4. Visiting a national park
5. Visiting the zoo or aquarium
6. Attending a wedding
7. Going to a concert
8. Going to a festival
9. Giving or receiving a gift
10. A school reunion
11. Taking a trip abroad
12. Catching up with an old friend
13. Meeting a new neighbor
14. Going to an engagement party
15. Memorable shopping trip
16. Volunteering
17. Camping
18. Going skiing or snowboarding
19. Going to the farmer's market
20. Shopping at a sale
21. Buying a new suit/dress
22. Teaching someone a new skill
23. Going fruit picking
24. Competing in a race
25. Going to a barbeque/picnic
26. Going to a Superbowl party
27. Watching a sports game
28. Visiting a friend out of state
29. Attending a graduation ceremony

30. Going to an amusement park
31. A heated argument
32. Attending a funeral
33. Going to a bad restaurant
34. Getting a parking ticket
35. Getting a speeding ticket
36. Losing money at a casino
37. Being humiliated
38. Doing something embarrassing
39. Being late for work/class
40. Hurting someone's feelings
41. Telling a lie
42. Conflict with a friend
43. Walking into wrong class/meeting
44. Forgetting someone's name
45. A bad day at work
46. Dropping something in public
47. Losing your luggage
48. Vehicle breaking down
49. Tripping on sidewalk
50. Spilling a drink on shirt
51. Nearly getting hit by car
52. Family member losing job
53. Wearing bathing suit in public
54. Taking an oral exam
55. First day of new job
56. Being late to an appointment
57. Encountering your landlord
58. Having an evaluation at work
59. Getting lost at airport
60. Having your house flooded

61. Going to a party
62. Performing in a play/concert
63. Job interview
64. Getting dumped by partner
65. Being yelled at
66. Throwing up in public
67. Slipping on ice
68. Spilling your dinner
69. Asking friend to change behavior
70. Confronting a roommate/neighbor
71. Refusing a request

Appendix B

Example of Coded Segment



Int1: Internal (episodic) event details

Ext1: Semantic details