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ORIGINAL ARTICLE

Joint Attention in Parent–Child Dyads Involving Children with Selective Mutism: A Comparison Between Anxious and Typically Developing Children

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Abstract Although joint attention processes are known to play an important role in adaptive social behavior in typical development, we know little about these processes in clinical child populations. We compared early school age children with selective mutism (SM; $n = 19$) versus mixed anxiety (MA; $n = 18$) and community controls (CC; $n = 26$) on joint attention measures coded from direct observations with their parent during an unstructured free play task and two structured tasks. As predicted, the SM dyads established significantly fewer episodes of joint attention through parental initiation acts than the MA and CC dyads during the structured tasks. Findings suggest that children with SM may withdraw from their parents during stressful situations, thus missing out on opportunities for learning other coping skills. We discuss the implications of the present findings for understanding the maintenance and treatment of SM.

Keywords Selective mutism · Joint attention · Anxiety disorders · Parent–child interactions

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Introduction

Selective mutism (SM) is a disorder that is characterized by a lack of speech in one or more social settings (usually outside the home) despite the presence of normal speech in other settings, usually within the home [1]. Although the disorder is typically diagnosed when children begin school and the demands for speaking outside the home increase, SM usually first appears during the preschool years [2, 3]. Its prevalence has been estimated at between .7% and 2% of children [4–7]. Selective mutism is currently categorized under "Other disorders of infancy and childhood" in the most recent Diagnostic and Statistical Manual (DSM-IV-R; [1]). However, there is some debate about its diagnostic presentation, with some researchers suggesting that SM should be viewed as an anxiety disorder [8–11], while others suggest it is associated with defiance and oppositional behaviors [12]. Dummit and colleagues (1997) found that, in a sample of 50 children with SM, all of the children met the diagnostic criteria for social phobia or avoidant disorder while only one child met the diagnostic criteria for oppositional-defiance disorder [13]. In a more recent study, Vecchio and Kearney (2005) compared three groups of children (SM, anxiety disorders, and controls) on parent- and teacher-rated measures of internalizing and externalizing behaviors as well as clinician assessments of psychopathology. They found that all 45 SM children in their sample met the diagnostic criteria for social anxiety disorder and that there were no differences in parent- or teacher-rated oppositional behaviors among the three groups [10]. Futhermore, longitudinal studies have found that, although many children with SM overcome the disorder as they get older, they often still experience shyness and symptoms of social anxiety [14]. Therefore, based on the present research, it appears that SM is more closely related to anxiety than defiance, although there may be a small group of children with SM who engage in oppositional behaviors and defiance.

Given that SM most often presents itself in the school setting and with unfamiliar individuals, such as teachers, many studies have focused on the functioning of children with SM in tasks associated with the school setting, such as language and academic development [2, 4, 15–19]. However, almost no research has investigated the quality of interactions between children with SM and their parents. Thus, it is unclear whether parent–child interactions involving children with SM differ from parent–child interactions involving typically developing children and, if there are differences, whether these differences may help researchers and clinicians better understand the developmental trajectory of SM.

There is, currently, an emphasis on research that focuses on the dyad as the unit of analysis and takes into consideration the bidirectional nature of the parent–child interactions rather than focusing on specific parental behaviors, such as parental rejection and parental control [20]. One such measure of parent–child interactions is joint attention, defined as a state in which both social partners are actively focused on the same object, activity, or event and are aware of each other's mutual focus [21]. Joint attention has been implicated as playing a role in socioemotional development, including the development of such skills as emotion regulation, problem solving, theory of mind, turn-taking, and expressive and receptive language [22–25]. Accordingly, the ability to engage in joint attention, especially when facing difficult and stressful situations, is important as it provides a way through which children can learn how to manage and problem-solve difficult situations. Thus, it is possible that one mechanism through which SM and, possibly, anxiety disorders may be maintained is that when children become overwhelmed by a particular situation, they may withdraw from interactions with their parents, thus missing out on opportunities to learn other coping and problem-solving skills.

The present study was a preliminary investigation of joint attention processes in the parent–child dyad in children with SM. We compared joint attention behaviors coded from unstructured and structured tasks in three groups of parent–child dyads: (1) children with SM and their primary caregivers (SM dyads); (2) children with anxiety disorders (the majority of children in this group were identified with specific phobia and/or separation anxiety disorder), and their primary caregivers [Mixed Anxiety (MA) dyads]; and (3) children with no internalizing problems and their primary caregivers [Community Control (CC) dyads].

We predicted that the SM and MA dyads would perform significantly lower on joint attention behaviors compared to the CC dyads, given the unfamiliar laboratory setting. Furthermore, we predicted that children in the SM group would engage in significantly fewer episodes of joint attention during structured tasks, given that the structured tasks were focused on preparation for a self-presentation task which was likely to be distressing for children in the SM group but not for children in the MA group, given their diagnostic presentations (i.e., specific phobias and separation anxiety). The inclusion of SM and MA groups provided further insight into similarities and differences between children with SM and children with anxiety disorders.

Method

Participants

Sixty-three children between the ages of 5 and 8 years were recruited from local mental health agencies, including one agency that has a regional selective mutism program, and from the McMaster Child Database. The Child Database comprises the names of healthy children recruited at birth from McMaster University Medical Centre and St. Joseph's Healthcare, Hamilton, Ontario. The parent and teacher measures were used for the purpose of group assignment in the present study. See Table 1 for demographic information.

Selective Mutism. Nineteen children were identified as having SM. The inclusion criteria for the SM group were as follows: (1) the parent and/or teacher indicated that the child did not speak in two or more situations as assessed on the SSQ [2, 26]; (2) the lack of speech was not due to a communication disorder; and (3) the lack of speech persisted for more than 1 month. Fourteen (74%) children met the criteria based on both parent and teacher reports, 2 (11%) children met the criteria based only on the parent reports; and 3 (16%) children met the criteria based only on the teacher reports. Of the 14 children whose parents completed the C-DISC-IVs, 6 (43%) had one comorbid anxiety disorder (separation anxiety or specific phobia) and 1 (7%) had two comorbid anxiety disorders (separation anxiety and specific phobia). None of the children in the SM group had comorbid social anxiety disorder. Five parents did not complete the C-DISC-IV due to scheduling difficulties. The data for these parent–child dyads were included in the analyses as the diagnosis of SM was not based on the C-DISC-IV.

Mixed Anxiety. Eighteen children met the diagnostic criteria for the MA group. The inclusion criteria for the MA group were as follows: (1) one or more anxiety diagnoses on the C-DISC-IV; and (2) no diagnosis of SM based on parent and/or teacher ratings on the SSQ. Twelve (67%) children had one anxiety disorder, 3 (17%) had two anxiety disorders, and 3 (17%) had three anxiety disorders. The most common anxiety disorders were specific phobia (61%), separation anxiety (39%), and social phobia (33%).

Community Control. Twenty-six children met the inclusion criteria for the community control group. The inclusion criteria for the community control group were as follows: (1)

Table 1 Demographic characteristics for full sample

	Selective mutism dyads ($n = 19$)		Mixed anxiety dyads ($n = 18$)		Community control dyads ($n = 26$)	
	Mean	SD	Mean	SD	Mean	SD
Child's age (in months)	76.32	10.69	75.44	12.49	72.88	9.24
	Total Number (%)		*Total Number (%)*		*Total Number (%)*	
Child's sex						
Female	11 (58%)		6 (33%)		10 (38%)	
Male	8 (42%)		12 (67%)		16 (62%)	
Primary caregiver's age						
19–39 years old	12 (63%)		11 (61%)		15 (58%)	
40–64 years old	7 (36%)		7 (39%)		11 (42%)	
Primary caregiver's education						
Completed secondary school	0 (0%)		4 (22%)		1 (4%)	
Some college/university	5 (26%)		3 (17%)		2 (8%)	
Completed college/university	14 (74%)		9 (50%)		18 (69%)	
Post-graduate degree	0 (0%)		2 (11%)		5 (19%)	
Primary caregiver employment						
Full-time	8 (42%)		4 (22%)		15 (58%)	
Part-time	8 (42%)		7 (39%)		7 (27%)	
Full-time and part-time	0 (0%)		0 (0%)		1 (4%)	
No employment	3 (16%)		7 (39%)		3 (12%)	
Family income*						
Less than $30,000	2 (11%)		2 (12%)		0 (0%)	
$30,000–$60,000	1 (6%)		6 (35%)		1 (4%)	
$60,000–$90,000	10 (56%)		5 (29%)		17 (65%)	
Greater than $100,000	5 (28%)		4 (24%)		8 (31%)	

**Note*. Information on family income was missing for 1 SM dyad and 1 MA dyad

no anxiety disorder diagnoses on the C-DISC-IV; (2) no diagnosis of SM based on parent and/or teacher reports on the SSQ; and (3) had to be recruited from the Child Database and not from one of the agencies.

Measures

The following parent-report and teacher-report measures were completed:

Parent Version of the Speech Situations Questionnaire (SSQ-Parent; [2, 26]). The primary caregiver completed the SSQ-Parent, a 15-item parent-report questionnaire that assesses the extent to which the child speaks in a variety of settings including the home, school, and community, and to a range of different people, including family, friends, and strangers, on a scale of 0 (never talks) to 2 (talks in a normal voice). The internal consistency of the SSQ-Parent has ranged from .82 [26] to .92 [18] in past studies, and it was .95 in the present study.

Computerized Diagnostic Interview Schedule for Children – IV (C-DISC-IV; [27]). The primary caregiver also completed the C-DISC-IV through a telephone interview with a trained research assistant after the laboratory visit. The C-DISC-IV is a structured

interview based on the DSM-IV that assesses children for 34 psychiatric disorders [27]. Due to time limitations, we only administered the Internalizing portion of the C-DISC-IV in the present study. Therefore, the children were assessed for the following internalizing disorders: panic disorder, generalized anxiety disorder, social phobia, specific phobia, separation anxiety, obsessive compulsive disorder, post-traumatic stress disorder, agoraphobia, and major depression. The C-DISC-IV has been shown to be a reliable measure of anxiety disorders (Shaffer et al., 2000). However, its diagnostic accuracy for the assessment of SM has not been established. Therefore, in the present study, we utilized parent- and teacher-report questionnaires for the assessment of SM and the C-DISC-IV for the assessment of anxiety disorders.

Teacher Version of the Speech Situations Questionnaire (SSQ-Teacher). Teachers completed the SSQ-Teacher, a 7-item questionnaire that asks teachers to rate the extent to which children speak in a variety of settings in the school, including the classroom, hallway, and playground, and to a variety of individuals, including teachers and friends, on a 3-point scale ranging from 0 (never talks) to 2 (always talks). We recently reported the internal consistency of the SSQ-Teacher as .95 [18], and it was .96 in the present study.

Procedure

Children and their parents were tested in the Child Emotion Laboratory at McMaster University. After signing the consent forms, the parent was asked to complete the questionnaires. The child's school address was also obtained and a questionnaire package was sent to the child's teacher.

Upon completion of the questionnaires, the parent and child were taken to a room where a table and two chairs were set up with a video camera facing the table. The parent and child were told that they would have an opportunity to complete some activities together. A laptop computer with a powerpoint presentation was set-up on a side-table beside the child and across from the parent. The parent was told that instructions for four activities would be presented on the computer and that a chime would sound with the presentation of each new instruction. The parent was told that he/she was to read the instructions and complete the indicated activities with the child. The experimenter then started the powerpoint presentation and left the room.

The parent and child were observed in the following four tasks: free play (5 min), discussion (2 min), preparation (5 min), and birthday speech (5 min). During the free play task, the parent and child were instructed that they could do whatever they liked for a few minutes, including using the provided paper and markers/crayons. The discussion task consisted of the parent and child talking together about the child's last birthday. During the preparation task, the parent was instructed to tell his/her child that he/she would have to give a speech about his/her last birthday in a few minutes. The instructions included a list of things that the speech should cover about the child's last birthday, including: (1) what he/she did; (2) who was there; (3) what presents he/she received; and (4) what he/she would like to do for his/her next birthday. The parent was instructed that he/she could help the child prepare for the speech in any way he/she liked. During the birthday speech, the parent was instructed to tell the child to stand up in front of the camera and to perform his/her speech about his/her last birthday. After 5 min, the computer chimed and the screen went black, indicating the end of the interactive episode. The experimenter came into the room and announced the end of the observation portion of the experiment. Given that the present study was focused on the back and forth interactive behaviors between parents and their children and that the birthday speech was meant as an assessment of the child's

behaviors and performance in a social presentation task, we examined only on the first three interactive tasks.

All procedures were approved by the McMaster University Health Sciences Research Ethics Board. Children were given $15.00 gift certificates to a local bookstore as a token of our appreciation for their participation in the study.

Behavioral Coding and Measures

The videotaped parent–child interactions were coded for joint attention behaviors using a modified coding protocol developed by Tasker and Schmidt [28] based on the work of others [21, 29–31]. The following joint attention behaviors were coded: Initiation Acts, Established Joint Attention, and Length of Joint Attention Episodes.

Initiation Acts. Initiation acts were spontaneous verbal or non-verbal communicative behaviors that were not part of an ongoing interactive episode and that were meant to attain and direct the social partner's attention to a particular object or event in order to share that object or event with the social partner [24, 32, 33]. Examples of initiation acts include, one of the social partner saying: "Lets play Xs and Os" or "Look at that poster. It's Piglet". Two types of initiation acts were coded: (1) Parental Initiation Acts (PIA), and (2) Child Initiation Acts (CIA). Both "successful" (i.e., those initiation acts that were responded to) and "unsuccessful" (i.e., those initiation acts that were not responded to) initiation acts were coded.

Established Joint Attention (EJA). Joint attention was considered established when a parent or child initiation act was followed by three on-topic, time-bound, contingent, back and forth communicative acts between the parent and child [28]. Thus, for joint attention to be considered established, the following sequence of behavioral events had to take place: (1) one of the social partners (i.e., the parent or the child) performed an initiation act as defined above; (2) the social partner to whom the initiation act was directed provided an on-topic verbal or non-verbal communicative act (often in the form of eye gaze, meant to indicate an awareness of the shared focus of attention [21, 22, 30, 34] within 5 s of the initiation act and that lasted a minimum of 3 s; (3) the initiating social partner performed an on-topic verbal or non-verbal communicative act within 5 s of the social partner's response act and that lasted a minimum of 3 s; and (4) the social partner performed an on-topic verbal or non-verbal communicative act within 5 s, indicating continued on-topic attention with the initiating social partner [28].

Joint attention was terminated when one of the social partners performed a termination act and lost focus in the interaction for more than 5 s. Termination acts included the following behaviors: novel initiations [33, 35], looking away [36, 37], yawning [38], moving away from the interaction, squirming [38], focusing on a different object (but not initiating to include the other social partner; [36]), and vocalizations of distress and frustration. One of the social partners had to engage in these termination behaviors for a minimum of 5 s for joint attention to be considered terminated [28].

We coded for two types of Established Joint Attention differentiated by who initiated the sequence of behaviors that lead to the establishment of joint attention. Parental Initiated Established Joint Attention (PIA-EJA) was defined as an established joint attention episode that was initiated by the parent (i.e., it began with a PIA) and Child Initiated Established Joint Attention (CIA-EJA) was defined as an established joint attention episode that was initiated by the child (i.e., it began with a CIA).

Average Length of Joint Attention Episodes. The length of time that dyads spent in a joint attention episode was calculated in seconds by subtracting the time at which joint

attention was established from the time at which joint attention was terminated (i.e., a termination act was performed and the social partner(s) remained off-topic for a minimum of 5 s). To calculate the average length of established joint attention episodes, we summed the lengths of all established joint attention episodes observed across a task and then divided by the total number of established joint attention episodes for that task.

We created separate joint attention behavior scores for structured and unstructured tasks. During the structured task, we coded only for those behaviors that were focused on the task that the dyad was instructed to complete (i.e., if during the preparation for the birthday speech, the parent and child played Xs and Os, this interaction was not included in the coding of joint attention). In total, dyads spent 7 min in structured tasks (i.e., discussion and preparation) and 5 min in unstructured tasks (i.e., free play). Therefore, to account for differences in time spent in structured versus unstructured tasks and to prevent these differences from confounding the analyses, we created relative frequency scores for our free play joint attention behaviors by multiplying all the free play joint attention behaviors by 7 and dividing by 5. Thus, the total scores for MIA, CIA, MIA-EJA, CIA-EJA, and Average Length of Joint Attention Episodes for the free play task comprised joint attention measures for our unstructured tasks. To create the structured tasks joint attention measures, we summed across the discussion and preparation tasks for each joint attention variable.

Behavioral Coding Reliability

One undergraduate student was trained by the first author in the coding protocol described. The undergraduate student was blind to the hypotheses of the current study as well as to group membership. Training in the coding procedure consisted of the undergraduate student learning the coding manual and coding three randomly selected tapes with the first author. To assess inter-rater reliability, 10 (16%) randomly selected tapes were coded by the undergraduate student and first author. The reliability for all the coding measures was very good with Cohen's kappa coefficients ranging from .75 (PIA) to .82 (PIA-EJA). The Intraclass correlation coefficient (ICC) for the continuous variable Average Length of Joint Attention Episode was excellent (.93).

Statistical Analyses

Three two-way repeated measures analyses of variance (ANOVAs) were conducted to assess the effects of group and type of task on the joint attention behaviors: CIA, CIA-EJA, and PIA-EJA. Type of task (unstructured, structured) was the within-subjects factor and group (SM, MA, CC) was the between-subjects factor. Given that child's age showed a statistically significant negative relation with PIA for the structured task and a statistically significant positive relation with Average Length of Established Joint Attention Episodes for the structured task, we conducted 2 two-way repeated measures analyses of covariance (ANCOVAs) with child's age as the covariate to assess the effects of group (SM, MA, CC) and task (unstructured, structured) on the joint attention behaviors PIA and Average Length of Established Joint Attention Episodes. Given that the assumption of homogeneity of variance was met, one-way analyses of variance or covariance (for measures that were related with child's age) with group as the between-subjects factor and structured or unstructured joint attention measure as the within-subjects factor, were used to deconstruct statistically significant interactions. Statistically significant one-way ANOVAs were followed up with Tukey HSD tests.

Results

Preliminary Analyses

There was a statistically significant difference between groups on the parent's education level such that parents in the CC and SM groups had higher levels of education than in the MA group. However, the parent's education level was not related to any of the behavioral measures assessed in the present study. Therefore, we did not control for the parent's education level in our analyses. The majority (92%) of parents in the present study were mothers. However, when we reran the analyses including only those dyads that had mothers as the parents our results remained the same. Therefore, the results presented include the full sample, with both mothers and fathers as parents.

Parent–Child Interaction Analyses

Parental Interactive Behaviors. There was a statistically significant Group x Task interaction ($F(2, 60) = 5.01$, $p = .01$, $\eta^2 = .14$) for PIA-EJA. Two one-way ANOVAs with Group as the between-subjects factor and unstructured task PIA-EJA and structured task PIA-EJA as the within-subjects factors were conducted. There were no statistically significant differences between the groups on the number of PIA-EJA during the unstructured task ($F(2, 60) = 1.56$, $p = .22$, $\eta^2 = .05$).

As predicted, the groups differed on the number of PIA-EJA during the structured task ($F(2, 60) = 4.47$, $p = .02$, $\eta^2 = .13$). Tukey HSD post hoc tests revealed that the SM ($M = 2.26$, SE $= 1.15$) group was lower on the PIA-EJA variable compared to both the MA ($M = 3.33$, $SE = 1.41$, $p = .02$) and the CC ($M = 3.15$, SE $= 1.05$, $p = .04$) groups (See Fig. 1).

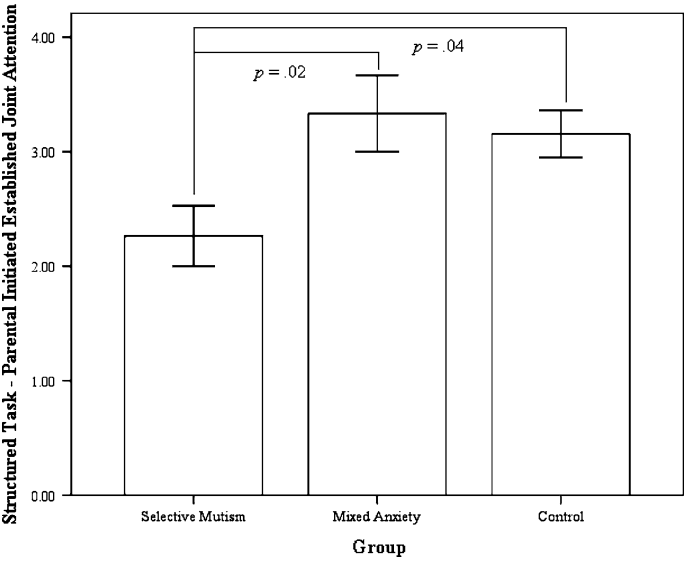

Fig. 1 Comparison among Selective Mutism, Mixed Anxiety, and Community Control groups on the frequency of Parent Initiated Established Joint Attention. *Error bars* represent standard errors

There was a statistically significant Group x Task interaction for PIA ($F(2, 59) = 6.69$, $p = .02$, $\eta^2 = .13$). However, follow-up tests between groups for each type of task (i.e., structured and unstructured) were not statistically significant.

Child Interactive Behaviors. There were statistically significant main effects for CIA ($F(1, 60) = 40.04$, $p < .01$, $\eta^2 = .40$) and for CIA-EJA ($F(1, 60) = 32.35$, $p < .01$, $\eta^2 = .35$). Regardless of group, children performed significantly more CIAs ($M = 2.15$, SE = .32) and CIA-EJAs ($M = 1.58$, SE = .24) during the unstructured task than the structured task ($M = .38$, SE = .09, $p < .01$, and $M = .38$, SE = .09, $p < .01$, respectively).

Average Length of Established Joint Attention Episodes. There was a statistically significant main effect for Average Length of Established Joint Attention Episodes ($F(1, 59) = 4.32$, $p = .04$, $\eta^2 = .07$). Regardless of group, dyads spent significantly more time in joint attention episodes during the unstructured tasks ($M = 133.73$, SE = 6.09) compared to the structured tasks ($M = 82.51$, SE = 13.05, $p < .01$).

Discussion

We conducted a preliminary investigation of differences in joint attention behaviors during unstructured and structured tasks among three groups of parent–child dyads that included: (1) children with SM; (2) children with one or more anxiety disorders; and (3) community controls. As predicted, we found that the SM dyads had less PIA-EJAs compared to the MA and CC dyads during the structured task, although there were no significant differences between groups in the number of PIAs or the average length of time spent in joint attention episodes. Given that the establishment of joint attention was conceptualized in the present study as requiring an initiation act to be followed by three contingent on-topic communicative acts between social partners [28] and that we found no significant differences in the frequency of PIAs, the finding of significantly fewer PIA-EJAs in the SM group compared to the MA and CC groups suggests that the selectively mute children may have been less responsive to their parents' communicative acts during the structured tasks, thus leading to a break down in the parent–child communication. We did not find any differences between the MA and CC groups in the number of PIA-EJAs during the structured task. This lack of difference may be explained by the nature of the structured tasks and the clinical diagnoses that composed the MA group. The structured portion of the mother–child interactions was composed of two tasks: (1) the discussion task in which the parent and child were instructed to talk about the child's last birthday; and (2) the preparation task in which the child was informed that he/she would be required to perform a birthday speech and during which the parent and child prepared the speech.

Given that the discussion task was only 2 min in length while the preparation task was 5 min in length, the majority of the behavioral coding on which the structured task composite measure was based was the preparation task. The extent to which such a task would be stressful for the MA group is questionable. The majority of children in the MA group either suffered from Separation Anxiety Disorder or Specific Phobia, and there were only 6 (33%) children who suffered from Social Phobia. Therefore, as a group, the MA children may not have been as affected by the self-presentation task and may have still remained engaged and co-operative during the structured tasks, thus resulting in no significant differences between the MA and CC dyads on the PIA-EJA variable. The incorporation of a pure social phobia group in the present study may have further clarified the present results.

The finding that children with SM tend to establish fewer episodes of joint attention during potentially stressful structured tasks is important as it highlights one mechanism through which the disorder may be maintained. Joint attention episodes have been implicated as important for socioemotional development, given that they are a state during which both social partners are actively focused on the same topic, event, or object, in order to affectively share the experience or for the purpose of providing information and clarification [39, 40]. Accordingly, joint attention processes provide an opportunity for the learning of such social skills as theory of mind, turn-taking, problem-solving [22, 23, 25], and emotion regulation [24]. When children withdraw from interactions with their parents, especially during stressful situations, opportunities for discussion of the upcoming event in order to reduce anticipatory negative thinking as well as modeling of such behaviors as emotion regulation, coping mechanisms, and problem solving, are lost. Consequently, children fail to learn and develop skills other than withdrawal and/or avoidance to cope with difficult situations, thus resulting in the continued maintenance of their underlying distress. This finding further highlights the potential usefulness of behavioral therapies as a treatment modality for children with SM, given that these therapies emphasize gradual exposure to stressful situations and the development of coping mechanisms [41]. As well, the present findings suggest that parental involvement in behavioral therapy [42], especially the teaching of strategies with which to engage their children's active involvement in approaching potentially stressful situations, may improve therapeutic outcome.

Although the present study identifies that children with SM are more likely to withdraw from structured interactions with their parents, the reason for their withdrawal is unclear. As mentioned in the introduction, there is debate in the literature as to whether SM is related to anxiety or to defiance. In the present study, we did not assess for any externalizing behaviors, including oppositional-defiance disorder, due to time constraints. Therefore, there are two possible explanations for why children with SM may have withdrawn from the interaction during the structured task. First, they may have become anxious as a result of the upcoming self-presentation task and coped with their anxiety by avoiding and withdrawing from the situation. In contrast, they may also have gotten frustrated by being given specific directions as to what to do and may have deliberately refused to follow their parent's instructions. Although the research to date has suggested that, for the most part, SM appears to be an anxiety disorder, there is a small percentage of children with SM who present with more defiant behavioral tendencies [43]. Therefore, it is possible that both mechanisms may underlie the present study's results.

With regards to the child variables, there were only significant main effects for task such that, regardless of group, all children performed significantly more CIAs and achieved significantly more CIA-EJAs in the unstructured free play task compared to the structured task. The manner in which the tasks were set-up may have influenced the results. The presentation of the instructions in the current study was such that a laptop was placed on a side-table behind the child and across from where the parent was sitting. The parent was instructed to read the instructions to him/herself and, with the exception of one set of instructions during the preparation task, the instructions were not to be read to the child. Although the child was free to turn around and look at the computer when the instructions were presented (and most children did do this in response to the chime), given that the age range in the present study was between 5 and 8 years of age, the majority of the children were unable to read and understand all of the instructions. Consequently, the parent was the one who first initiated by communicating to the child the instructions. For the unstructured free play task, the instructions were simple in that the parent and child were allowed to play as they wished for a few minutes. Therefore, the child was free to initiate the interaction

around whatever topic he/she chose. In contrast, for the structured tasks, there were specific instructions as to what the parent and child were to do and any off-topic interactions (i.e., interactions that were not focused on discussing the child's last birthday or preparing for the birthday speech) were not coded. This increased structure, the nature of the coding protocol, and the fact that the parents continuously saw the instructions while the child did not, may have lead to the lower frequency of both child variables during the structured task.

Contrary to our predictions, there were no group differences for the average length of time spent in joint attention episodes. Therefore, it appears that, although the SM dyads may establish fewer joint attention episodes, once they do successfully establish a joint attention episode, on average they spend about the same amount of time in those episodes as the MA and CC dyads.

Strengths

The present study has a number of strengths that need to be highlighted. First, to the best of our knowledge, this is the first study that has examined parent–child interactions in children with SM and in children with anxiety disorders using the dyad as the unit of analysis and focusing on the back and forth verbal and non-verbal joint attention communication acts between parents and their children coded from direct observations rather than on global measures of parenting and other subjective measures. The inclusion of non-verbal behaviors in our coding protocol is important as children with SM may differ in the manner in which they interact with their parents due to their inhibition of speech in certain situations. Thus, the inclusion of both verbal and non-verbal behaviors ensures that any group differences that we found are not due to biases in our coding protocol. Second, the incorporation of both structured and unstructured tasks provides a more complete perspective of parent–child interactions in children with anxiety disorders and children with SM, given that past research has shown that interactive behaviors are influenced by context and by situational demands [44]. Third, given the rarity of SM, obtaining sample sizes that are large enough for statistical comparisons is a challenge. The present study had a relatively large sample of children with SM.

Limitations

There are also a number of limitations that need to be acknowledged. First, diagnostic categories were determined based on parent and teacher questionnaires as well as the C-DISC-IV, which was completed by a research assistant who was trained by one of the clinical psychologists on the research team. Therefore, the diagnoses were not ascertained through interview or observation by a clinical psychologist. It is interesting to note that, in the present study, none of the children in the SM group had a comorbid diagnosis of social anxiety disorder. This pattern may be a reflection of the manner in which diagnoses were determined.

Second, the MA group comprised children who met the criteria for one or more anxiety disorders on the C-DISC-IV. In the end, the majority of children in this group either had separation anxiety or specific phobia and a minority of children had social phobia. However, there were varying degrees of impairment in the group, given that some children had one anxiety disorder while others had up to three anxiety disorders, and given that some children were recruited from local mental health agencies where they were receiving treatment while others were recruited from the local community and had never received treatment. To test whether there were differences in functional impairment in the MA group, we divided the children in the MA group according to whether they were recruited

from a clinic ($n = 8$) or from the community ($n = 10$). Independent samples *t*-tests revealed that those children in the MA group who were recruited from a clinic were rated by their parents as significantly higher on school avoidance and generalized anxiety disorder compared to the children in the MA group who were recruited from the community and had never received treatment. Although limited by a small sample size, this finding provides some support for the fact that there was heterogeneity of impairment in the MA group with children who were recruited from a clinic showing higher rates of functional impairment than children recruited from the community.

Third, given that the structured task focused on preparation for a self-presentation task, it may not have influenced the MA group as strongly as the SM group. It would be interesting to conduct the present study with a pure social phobia group, given that research has suggested that SM may be a variant of social phobia.

Fourth, due to the high degree of comorbidity between SM and anxiety disorders, we were unable to attain a pure SM group. Therefore, it is unclear the extent to which the results are reflective of SM or a combination of SM and comorbid anxiety disorders. As well, in the present study, we did not assess for externalizing disorders due to time-limitations. Therefore, it is unclear to what degree the children in our sample may have suffered from comorbid oppositional-defiance disorder.

Fifth, given that the tasks had a logical sequence (i.e., free play, discussion about last birthday, and preparation for birthday speech), we were unable to counter-balance the order of presentation of the tasks. This is a limitation of the present study as there was no "warm-up" period in the room during which the children were able to get acclimated to their surroundings and the presence of the video camera. Thus, this design may have influenced the pattern of results, especially with the SM children.

Sixth, given that the sample was observed on only one occasion, future studies may consider implementing a more robust design by presenting multiple trials for each type of task (i.e., unstructured and structured) using different situations and repeated measurements across time. This approach would provide longer and more varied observations of each type of task, thus increasing the generalizability and validity of the findings.

Seventh, our current coding protocol focused on the frequency of back and forth communicative acts between parents and their children. However, there was no consideration of the content of the interactions. Future studies should attempt to also transcribe the interactions for verbal and non-verbal behaviors and to analyze the joint attention episodes for the content of what is said between the parent and child (i.e., the discussion of coping mechanisms during structured tasks, the tendency of parents to over exaggerate threat, etc.). Such an in-depth analysis would provide further insight into the mechanisms through which parenting may be maintaining the disorder.

Eighth, the children in our sample ranged in age from 5 to 8 years, thus there was some variability in cognitive and psychomotor ability. Although we did investigate relations between age and our dependent measures and controlled for child's age where necessary, a more homogenous age group, although difficult to attain, may provide further insight into the quality of parent–child interactions in children with SM compared to children with anxiety disorder and community controls.

Summary

In the present study, we investigated joint attention behaviors during unstructured and structured tasks in 3 groups of parent–child dyads: (1) children with SM and their parents (SM dyads); (2) children with anxiety disorders and their parents (Mixed Anxiety dyads);

and (3) children with no SM or anxiety disorders and their parents (Community Control dyads). We found that the SM dyads engaged in significantly fewer joint attention behaviors during the structured tasks compared to the MA and CC dyads. There were no differences between groups on the unstructured free play task. The present study illustrates that joint attention behaviors appear to be impoverished in SM dyads when faced with the completion of structured tasks that may be potentiality stressful (i.e., preparation for a self-presentation situation). Although it is difficult to ascertain the reasons why children with SM withdrew from the interactions (i.e., whether they withdrew from the interactions due to anxiety or due to purposeful oppositional behaviors), the fact that they had lower joint attention episodes is significant, given that joint attention has been implicated in the development of emotion regulation and problem-solving. Thus, these results highlight a potential mechanism through which the disorder may be maintained, given that the children's withdrawal impedes their ability to learn coping mechanisms from their parents, and also stress the importance of behavioral therapies for the treatment of SM.

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