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Assessing Peer-Related Impairments Linked to Adolescent Social Anxiety: Strategic Selection of Informants Optimizes Prediction of Clinically Relevant Domains

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Abstract

Socially anxious adolescents commonly experience impaired interpersonal functioning with unfamiliar, same-age peers. Yet, we lack short screening tools for assessing peer-related impairments. Recent work revealed that a parent-reported, three-item screening tool produced scores that uniquely related to social anxiety concerns. However, this tool ought to go beyond linking impairments to service *needs* (i.e., social anxiety symptoms). This tool should also inform the *goals* of services, in particular by linking impairments to key domains relevant to therapeutically addressing adolescents' anxiety-related needs, such as social skills when interacting with unfamiliar peers. This requires an assessment approach that involves strategic selection of informants who vary in their expertise for observing anxiety-related needs, as well as the therapeutic goals for addressing anxiety-related impairments (e.g., social skills within peer interactions). We leveraged parents' reports to link impairments to social anxiety-related needs. To link impairments to social skills, we leveraged informants (i.e., *unfamiliar untrained observers*; UUOs) who observed adolescents within tasks designed to simulate interactions with same-age, unfamiliar peers. We tested this approach using a mixed-clinical/community sample of 134 14-to-15-year-old adolescents. We leveraged multi-informant survey reports to assess adolescent social anxiety, and trained independent observers rated adolescents' social skills within unfamiliar peer interactions. Parents' reports performed best when distinguishing adolescents on referral status and predicting survey-reported social anxiety, whereas only UUOs' reports predicted independent observers' social skills ratings. These findings inform the strategic selection of informants for assessing impairments that commonly prompt the need for adolescents to access mental health services for social anxiety.

Keywords: Adolescents; Impairment; Peer relations; Social anxiety; Unfamiliar Peer Paradigm

The core features of social anxiety disorder revolve around experiencing intense fear and avoidance of social situations, particularly those marked by interactions with unfamiliar people (American Psychological Association [APA], 2013). Social anxiety is one of the most prevalent psychological disorders in the United States, with a 12-month prevalence rate of 7.4% and a lifetime rate of 13% (Kessler et al., 2012). Relative to earlier and later developmental periods, the condition tends to spike among adolescents (Kessler et al., 2005), and when left untreated, may portend increases in maladaptive outcomes in adulthood, including substance use and abuse, depression, unemployment, and chronic stress (e.g., Epkins & Heckler, 2011; Essau et al., 2014). Thus, adolescence marks a key period for developing evidence-based assessments of not only core features of social anxiety, but also key impairments linked to adolescent social anxiety.

Among adolescents, persistent avoidance of anxiety-provoking social situations tends to portend chronic deficits in interpersonal functioning and poses challenges with normatively developing social skills (Alfano & Beidel, 2011). Consequently, relative to same-age peers, adolescents who experience social anxiety often encounter significant challenges with interacting with unfamiliar peers, as well as developing and maintaining friendships (Beale et al., 2018; Cannon et al., 2020; Glenn et al., 2019). In fact, adolescent clients commonly identify difficulties interacting with unfamiliar peers as a key need for social anxiety-related services (Hofmann et al., 1999), and positive peer relationships buffer against the worsening of social anxiety symptoms (e.g., Markovic & Bowker, 2017).

Yet, difficulties with peer relationships are not unique to social anxiety: They also manifest in the clinical presentations of other conditions that commonly precipitate adolescents' needs for mental health services, including attention-deficit/hyperactivity disorder (ADHD) and depression (Epkins & Heckler, 2011; Jarrett and Ollendick, 2008; Prinstein et al., 2018). Further, peer-

related impairments comprise some but not all of the impairments reflecting adolescent clients' clinical presentations (APA, 2013). Importantly, routine service settings commonly experience time and resource challenges incorporating evidence-based assessments into service delivery (Becker-Haimes et al., 2020). Thus, we require tools that not only assess peer-related impairments that are *unique* to those of socially anxious adolescent clients (see also Rapee et al., 2012), but also facilitate detecting these impairments with a high degree of efficiency.

Recent work leveraged items from the most widely used diagnostic interview for assessing youth anxiety disorders (i.e., the Anxiety Disorders Interview Schedule for Children and Adolescents [ADIS-C/A]; Silverman & Albano, 1996) to efficiently screen for peer-related impairments, namely a series of items from the ADIS-C/A's *Interpersonal Relationships Module*. A key diagnostic goal involves identifying areas of life interference that stem from specific symptoms or disorders (Goldstein & Naglieri, 2016). Thus, these items were specifically designed to index peer-related impairments linked to anxiety. To this end, Beale and colleagues (2018) tested parents' responses to three of these items: (a) *Would you say your child has more friends/fewer friends/same number as most kids?* (response options: more friends, same number of friends, or fewer friends relative to same age peers); (b) *Do you think your child has trouble making friends?* (response options: yes or no); and (c) *Once your child has made friends, do you think he/she has trouble keeping them?* (response options: yes or no). Parents' responses to these items not only differentiated adolescents on referral status but also *uniquely* predicted survey reports of adolescents' social anxiety. That is, the authors demonstrated the predictive utility of parents' reports while accounting for domains with demonstrated links to peer-related impairments, namely depressive and ADHD symptoms. This work supports use of parents' reports on these items to assess peer-related impairments linked to social anxiety-related needs.

As with assessing any other domain relevant to youth mental health, accurately assessing peer-related impairments requires information sources beyond parents. Indeed, with their notion of *situational specificity*, Achenbach and colleagues (1987) argued that youth behave in systematically different ways, depending on the social context. In fact, contexts often vary in the degree to which they contain *contingencies* or specific circumstances (e.g., aversive peer interactions) that elicit clinically relevant or impairing behaviors (e.g., social skills deficits; see Skinner, 1953). This notion holds true for assessing all mental health-relevant domains, including symptom domains (e.g., social anxiety) and impairment domains (e.g., impairments linked to peer interactions; see De Los Reyes et al., 2022a). No one type of informant (e.g., parents) can capably observe youth across all contexts and contingencies. Thus, a core feature of multi-informant approaches to assessment involves strategically selecting informants who vary from each other in their expertise for observing youth within and across contexts (e.g., home, peer interactions; Kraemer et al., 2003; Makol et al., 2020). That is, multi-informant approaches ought to allow researchers to attain *context-sensitive* estimates of mental health domains.

In the case of peer-related impairments, context-sensitive assessment involves leveraging informants who collectively provide reports that inform our understanding of both a clients' *needs* for services and key domains that reflect *therapeutic goals* for these services. Yet, a key limitation of current multi-informant approaches to assessing youth mental health is our limited understanding of how to select informants to achieve these aims of context-sensitive assessment. The recently developed Needs-to-Goals Gap framework seeks to address this current limitation in the multi-informant assessment literature (De Los Reyes et al., 2022b). Informed by Achenbach and colleagues' (1987) notion of situational specificity, the framework guides researchers on how to identify informants who contribute context-sensitive reports that inform

effective service delivery. Collecting context-sensitive reports becomes particularly salient when assessing peer-related impairments linked to social anxiety. That is, as key stakeholders tasked with seeking out services on behalf of adolescents, parents often have the expertise to report about impairments linked to general needs for services, such as social anxiety (see Hunsley & Lee, 2014). Yet, identifying needs such as social anxiety only represents a starting point of these services. Setting therapeutic goals also requires careful attention to linking peer-related impairments to specific domains known to contribute to impairments within peer interactions.

Along these lines, addressing adolescents' anxiety-related needs often involves improving psychosocial strengths such as social skills, in an effort to promote long-term reductions in social anxiety symptoms and anxiety-related impairments (see also Alfano & Beidel, 2011). In fact, addressing adolescent clients' social skills often requires directly targeting contingencies linked to interacting with same-age, unfamiliar peers (Cannon et al., 2020). Yet, relative to younger children, adolescents spend a considerable amount of time outside of the home (e.g., Ingersoll, 1989). As such, parents often have few opportunities to directly observe a considerable amount of their adolescent's activities, including how they interact with unfamiliar peers (e.g., Smetana, 2008). As evidence of this, consider that parents' survey reports of adolescent social anxiety fail to predict adolescents' self-reported reactions to laboratory-based interactions with youthful-looking personnel trained to "stand in" as same-age unfamiliar peers (i.e., *peer confederates*; Deros et al., 2018). Taken together, we require informants—beyond parents—with expertise in observing adolescents within social interactions germane to linking peer-related impairments to social skills functioning, namely interactions with same-age, unfamiliar peers.

Recent laboratory work points to informants with the potential to fill these important gaps in the multi-informant assessment literature. In an effort to gather ecologically valid simulations of

adolescents' interactions with unfamiliar peers, researchers developed the Unfamiliar Peer Paradigm (Cannon et al., 2020), which consists of a series of social interactions between adolescents and the peer confederates described previously. This short, 20-minute task yields a series of "thin slices" or samples of an adolescent's behavior. In fact, recent work indicates that this 20-minute period may provide sufficient information for an untrained rater who is unfamiliar to the adolescent (i.e., *unfamiliar untrained observer*; UUO; Rezeppa et al., 2021) to observe and then rate the adolescent's behavior, using surveys of parallel format to those completed by other, untrained informants, such as adolescents and parents.

In the first investigation of the psychometric properties of UUOs' reports, Rezeppa and colleagues (2021) tested UUOs' reports about the subtle avoidance behaviors the adolescents engaged in during the Unfamiliar Peer Paradigm (i.e., *safety behaviors*; see also Qasmieh et al., 2018). UUOs' safety behavior reports significantly related to the self-reports of adolescents, as well as trained independent observers' ratings of adolescents' social skills as displayed during the social interactions. This study provides important "proof of concept" data to support the notion that UUOs might also provide psychometrically sound reports about social anxiety-relevant processes beyond safety behaviors, such as peer-related impairments.

Purpose and Hypotheses

The purpose of this paper was to test a multi-informant approach to screening for peer-related impairments, optimized to link impairments to not only adolescents' social anxiety-related needs but also domains relevant to therapeutically addressing these needs (i.e., social skills; Alfano & Beidel, 2011). In a mixed-clinical/community sample of adolescents and their parents, we collected peer-related impairment reports from parents, as in prior work (Beale et al., 2018). We also collected reports about peer-related impairments from UUOs, who based their reports on

adolescents' behavior within the Unfamiliar Peer Paradigm (Cannon et al., 2020). We examined both parents' and UUOs' reports about adolescents' peer-related impairments in relation to a multi-informant, multi-modal battery of assessments. This battery allowed us to test parents' and UUOs' reports about peer-related impairments in relation to assessments of needs-relevant domains (i.e., referral status, social anxiety symptoms), as well as domains reflective of therapeutic goals for anxiety-related services (i.e., trained observers' ratings of adolescents' social skills within simulated interactions with same-age, unfamiliar peers). We tested two hypotheses informed by the recently developed Needs-to-Goals Gap Framework (De Los Reyes et al., 2022b). Specifically, a parent's utility as an informant stems from their role in seeking out mental health services on behalf of their adolescent, and their knowledge about their child's general needs for such services (e.g., social anxiety; see Hunsley & Lee, 2014). Thus, we expected parents' reports to optimally perform in tests that link reports about peer-related impairments to domains relevant to identifying social anxiety-related needs. These included tests of the ability of reports to distinguish adolescents on referral status, as well as predict multi-informant survey reports of adolescent social anxiety. In contrast, and in light of their expertise in observing domains relevant to the contingencies that maintain adolescents' anxiety-related needs, we expected UUOs' reports to optimally perform when predicting adolescents' social skills within interactions with peer confederates.

Method

Participants

Participants were 134 adolescents aged 14-15 years old (M = 14.5 years; SD = 0.5) and their parents, recruited as part of a larger study (e.g., De Los Reyes et al., 2019a; Cannon et al., 2020; Deros et al., 2018; Glenn et al., 2019; Karp et al., 2018). We required eligible dyads to: (a) speak

English; (b) understand the consent and interview process; and (c) be comprised of an adolescent aged 14-15 years-old currently living in the home who, based on parent report, did not have a history of learning or developmental disabilities. Parents reported 89 adolescents as female and 45 as male. Parents also reported their adolescent's racial/ethnic background as follows: African American or Black: 53%; White, Caucasian American, or European: 34%; Asian American or Asian: 5%; Hispanic or Latino/a (Spanish): 10%; American Indian: 0.7%; or "Other": 7%. The parents could select multiple racial/ethnic backgrounds, leading to these rates totaling over 100%. Parents reported weekly household income in increments of $100 (e.g., $101-$200 per week) with the following breakdown: 26% of parents earned $500 or less per week, 22% earned between $501 and $900 per week, and 51% earned more than $901 weekly. Parents reported marital status with 50% currently married, 21% never married, 16% divorced, 8% separated, 4% cohabitating, and 0.7% widowed. Parents also reported their highest level of education, with 3% less than high school or equivalent, 14% a high school diploma or equivalent (i.e., GED;), 17% some college, 10% an associate's or vocational degree, 19% a bachelor's degree, 23% a master's degree, and 13% an advanced degree (e.g., PhD, JD, MD).

Procedure

The Institutional Review Board of the large mid-Atlantic university where the study was conducted approved the procedures of the study prior to administration. We recruited participants from Maryland, Washington D.C., and Northern Virginia via public advertisements. We recruited participants through a variety of methods including advertisements online (e.g., Craigslist, the laboratory website, Facebook, and Google Ads), on public transportation (e.g., buses, Metro rail, and Metro stations), and in local spaces (e.g., flyers posted in the community including bulletin boards and community listservs, cards handed out during campus events).

Recruitment also took place at the offices of local mental health professionals (i.e., doctor's offices, clinics, and hospitals) who serve the targeted population.

Parents who contacted the laboratory in response to recruitment efforts completed an initial phone screen with the laboratory staff, to assess if they and their adolescent met inclusion/exclusion criteria. If they met the criteria, we scheduled them to complete assessments in the laboratory. For the in-person assessment, research personnel described the study and provided parental consent and adolescent assent forms to review and sign. Following consent/assent, adolescents and parents completed parallel sets of survey measures independently on computers in counterbalanced order using the Qualtrics survey platform. Additionally, adolescents completed three counterbalanced social interactions tasks with study personnel trained to interact with the adolescents as unfamiliar peer confederates (see Cannon et al., 2020). Upon completing the study tasks, families received a total of $100 in monetary compensation ($50 for the parent and $50 for the adolescent).

We used two different advertisements to recruit participants, depending on the *referral status* of the adolescent (i.e., referred for a clinical evaluation vs. participated in a non-clinical evaluation). One advertisement depicted a no-cost screening clinical assessment for evaluation of adolescent social anxiety (i.e., clinic-referred adolescents; $n = 45$). The other depicted a study assessing parent-child interactions (i.e., community control adolescents; $n = 89$). Both groups completed the same assessments and tasks. Following their study participation, parents in the clinic-referred group received feedback on their adolescent's functioning and referrals for treatment, whereas those in the community control group did not receive feedback/referrals.

With the exception of aims involving between-group comparisons (i.e., tests of referral status), for this study we used an analytic approach that pooled these two groups into one sample.

By combining these two groups, we capitalized on key features of adolescent mental health concerns, namely that they dimensionally vary in the general population (i.e., fewer numbers of adolescents displaying concerns relative to those not displaying concerns, and scores ranging from relatively low concerns to relatively high concerns). This is an approach taken in multiple studies leveraging this same sample (e.g., Deros et al., 2018; Glenn et al., 2019; Makol et al., 2020; Rezeppa et al., 2021). Further, this approach is consistent with both current initiatives focused on dimensional models of psychopathology (e.g., Insel et al., 2010), and prior work indicating enhanced reliability and validity for dimensional approaches to measuring and examining psychopathology, relative to discrete approaches (e.g., testing aims separately within subgroups; Markon et al., 2011). Prior work indicates this approach results in clinic-referred and community control groups that display comparable demographic characteristics as well as similar relations among scores taken from study instruments (e.g., survey reports and behavioral ratings), thus further justifying use of this approach (see Glenn et al., 2019; Makol et al., 2020). Demographic data for these groups are available upon request from the corresponding author.

Unfamiliar Peer Paradigm

The Unfamiliar Peer Paradigm consists of a series of counterbalanced social interaction tasks designed to simulate how adolescents react to social interactions with same-age, unfamiliar peers. The interaction tasks within the Unfamiliar Peer Paradigm included a Simulated Social Interaction Test (SSIT), Unstructured Conversation Task (UCT), and Impromptu Speech Task (IST). Extensive descriptions of this paradigm exist elsewhere (see Cannon et al., 2020), and we provide descriptions of the tasks in our online supplementary material

Peer Confederates

Within the Unfamiliar Peer Paradigm, adolescent participants interacted with trained, gender-

matched research personnel posing as unfamiliar, same-age peers. Consistent with prior work (Anderson & Hope, 2009; Deros et al., 2018; Glenn et al., 2019), these peer confederates were youthful-looking undergraduate or post-baccalaureate research assistants who had no prior contact with the adolescent with whom they interacted. We also masked peer confederates to the adolescent's referral status and all other clinical information about the adolescent. Peer confederates underwent extensive training that included training in the responsible conduct of research as well as specific training on serving the confederate role. Within this role, we required peer confederates to memorize and rehearse a detailed set of scripted procedures germane to administering the interaction tasks embedded in the Unfamiliar Peer Paradigm. Peer confederates began training by observing administration of the Unfamiliar Peer Paradigm by trained personnel. Following these observations, peer confederates engaged in a series of practice sessions focused on rehearsing their role(s) in the paradigm (i.e., approximately 10-15 hours of practices spread out over several weeks). Following these sessions, peer confederates engaged in a formal clearing process that involved administering the paradigm to mock participants (e.g., other research personnel) and under the supervision of trained personnel in the laboratory (e.g., laboratory manager, project coordinator). In order for a peer confederate to be involved in this study, they must have been judged by trained personnel in the laboratory as prepared to serve the peer confederate role. Following their interactions with an adolescent, peer confederates completed a survey report about the adolescent's social anxiety, based on their experiences interacting with the adolescent.

Unfamiliar Untrained Observers

Using archival videos of the adolescent's participation in the Unfamiliar Peer Paradigm, we randomly assigned UUOs to view up to three recordings of the social interaction tasks. After

viewing the recordings, UUOs made survey reports about each adolescent on battery of multiple measures, including the peer-related impairments screening measure described previously. Importantly, UUOs received no training on how to make their reports. In this respect, they received measure instructions akin to the other informants involved in the study (i.e., parents and adolescents). We masked UUOs to adolescents' referral status and all other clinical information. In online supplementary material, we report additional characteristics, including demographics, of the UUOs who completed reports.

Trained Independent Observers

We leveraged behavioral reports from trained independent observers to assess adolescents' social skills within the Unfamiliar Peer Paradigm. This approach allowed us to avoid shared method bias across informants used to assess other key constructs (i.e., informants' reports of peer-related impairments). The trained independent observers consisted of undergraduate and post-baccalaureate research assistants who did not participate in any of the social interaction tasks as a peer confederate and did not complete survey reports as a UUO. As with UUOs, we masked independent observers to adolescents' referral status and all other clinical information. We provide extensive information on coder training and characteristics in online supplementary material, as well as in prior work (Botkin et al., 2021; Cannon et al., 2020; Glenn et al., 2019).

Independent observers made global ratings of each adolescent's social skills using an extensively validated behavioral coding scheme (e.g., Glenn et al. 2019). For each domain, independent observers based their ratings on observations of the SSIT (five ratings), UCT (one rating), and IST (one rating). Independent observers made social skills ratings on a 5-point scale ranging from 1 (*Not effective at all*) to 5 (*Very effective*), where higher scores indicated greater social skills. For each adolescent, a pair of coders rated their social skills, with their ratings

displaying an *ICC* (for average measures) of .81. This average *ICC* is considered within the "excellent" range, based on thresholds recommended by Cicchetti (1994).

For each adolescent, we computed composite scores for each of the seven task ratings (5 SSIT [$M = 3.74$; $SD = 0.84$], 1 UCT [$M = 3.14$; $SD = 1.31$], 1 IST [$M = 3.67$; $SD = 1.00$]) by taking an average of the pair of the independent observers' ratings. Although we computed composite scores for all 134 adolescents, some were missing data on one task rating (e.g., one of the five SSIT ratings), whereas three adolescents declined to give a speech for IST. Therefore, for these adolescents, we based their composite scores on six, rather than seven, social skills ratings. Independent observers' ratings relate to well-established survey measures of adolescent social anxiety and related processes (e.g., safety behaviors, fears of evaluation, psychosocial impairments) and distinguish adolescents on referral status (e.g., Botkin et al., 2021; Cannon et al., 2020; Glenn et al., 2019; Rezeppa et al., 2021).

Survey Measures

Across adolescent participants, their parents, peer confederates, and UUOs, surveys focused on assessing adolescents' peer-related impairments and social anxiety. Parents also completed a demographics form to collect the adolescent, parent, and family demographic information described previously. Across survey measures, we held all item content constant, with minor modifications to fit each informant's perspective (e.g., *"I"* for adolescents; *"my child"* for parents; *"the participant"* for peer confederates and UUOs).

Screening Items for Peer-Related Impairments

We collected reports about peer-related impairments from two informants. First, during a preliminary phone screening, we asked parents to provide reports on three peer-related impairment items from the ADIS-C/A (Silverman & Albano, 1996). The items administered

included (a) *Would you say your child has more friends/fewer friends/same number as most kids?* (response options: more friends, same number of friends, or fewer friends relative to same-age peers); (b) *Do you think your child has trouble making friends?* (response options: yes or no); (c) *Once your child has made friends, do you think he/she has trouble keeping them?* (response options: yes or no). Second, we collected reports on these same three items from UUOs, based on their observations of adolescents' behavior during the Unfamiliar Peer Paradigm. When administered to parents, this screening distinguishes adolescents on referral status and clinical elevations on symptom measures of social anxiety (Beale et al., 2018).

We began collecting peer-related impairment data from parents with the eighth family recruited for this study sample. Thus, all parent-reported data reported using this instrument reflect that which we collected from the 127 families with complete data. However, because we had access to all 134 archived videos of adolescents' behavior within the Unfamiliar Peer Paradigm, we collected 134 peer-related impairment reports from UUOs. To score data taken from these reports, we grouped adolescents in terms of the number of items for which each informant positively endorsed peer-related impairments (i.e., response for "number of friends" item: "fewer friends"; response for "making friends" item: "yes"; response for "keeping friends" item: "yes"). We allocated adolescents into one of three groups: "0" peer-related impairments (parents: $n = 64$; UUOs: $n = 57$); "1" peer-related impairment (parents: $n = 25$; UUOs: $n = 24$); or "2 or more" peer-related impairments (parents: $n = 38$; UUOs: $n = 53$). Consistent with prior work (Beale et al., 2018), we grouped adolescents for whom informants endorsed 2 versus 3 impairments in the same group, given the small number of adolescents who informants rated as displaying 3 peer-related impairments.

Social Interaction Anxiety Scale (SIAS)

The SIAS (Mattick & Clarke, 1998) is a 20-item scale designed to assess social anxiety symptoms while interacting with others (e.g., *"I am unsure whether to greet someone I know only slightly"* and *"I feel I'll say something embarrassing when talking."*). Informants (i.e., adolescents, parents, peer confederates) rated each statement on a 5-point Likert scale ranging from 0 *(Not at all characteristic or true of me*) to 4 (*Extremely characteristic or true of me*). When used to assess adolescents, informants' reports on the SIAS display high levels of internal consistency ($\alpha > .90$) and distinguish adolescents on referral status (Deros et al., 2018). Further, informants' SIAS reports relate to observed social skills (Glenn et al., 2019).

Data-Analytic Plan

Preliminary Analyses

We followed a multi-step plan for addressing our aims. First, we assessed the reliability of our instruments by calculating estimates of either internal consistency (Cronbach's α for survey measures) or inter-rater reliability (*ICC*s for independent observers' ratings). We interpreted these calculations relative to conventions for α (e.g., Nunnally & Bernstein, 1994) and *ICC*s (e.g., Cicchetti, 1994). We then computed means and standard deviations for all continuous measures, calculated statistics for skewness and kurtosis to determine if our data met assumptions for our planned parametric analyses (i.e., skewness/kurtosis in range of ±2.0; Tabachnick & Fidell, 2001), and computed correlations among informants' survey reports about adolescent social anxiety. As detailed in our online supplementary material, we integrated data from our multi-informant social anxiety assessments, using a strategy informed by decades of research on the discrepant assessment outcomes that commonly result from this approach (see also Achenbach et al., 1987; De Los Reyes et al., 2013a, 2015, 2019b; Deros et al., 2018; Kraemer et al., 2003; Makol et al., 2020; Osborne & Costello, 2004). We also tested the

correspondence between parents' and UUOs' reports about adolescents' peer-related impairments by computing a chi-square (χ^2) statistic. We used this technique in light of the ordinal scaling for both indices. We interpreted magnitudes of effects based on the Cramer's *V* statistic and interpretative conventions for this metric (i.e., Gravetter & Wallnau, 2013).

Links between Reports about Peer-Related Impairments and Referral Status

To test the relations between parents' and UUOs' reports about adolescents' peer-related impairments and referral status, we computed separate χ^2 statistics for parents' and UUOs' reports. We interpreted the magnitudes of these effects using the Cramer's *V* statistic.

Links between Reports about Peer-Related Impairments and Social Anxiety Symptoms

To examine links between parents' and UUOs' reports about peer-related impairments and adolescent social anxiety, we conducted analyses of variance (ANOVAs). In separate tests, we entered either parents' or UUOs' reports about peer-related impairments as a between-subjects factor, and the SIAS *Trait* score as the dependent variable. In the presence of a significant omnibus effect, we conducted follow-up univariate contrasts using Dunnett's *T*3 tests (i.e., to account for inequality of variances). Consistent with prior work and to reduce Type I error (Beale et al., 2018), we specifically focused on comparisons between adolescents displaying "0" peer-related impairments compared to the two other groups (i.e., "1" and "2 or more").

Links between Reports about Peer-Related Impairments and Observed Social Skills

To test links between parents' and UUOs' reports about peer-related impairments and independent observers' ratings of adolescent social skills, we constructed two generalized estimating equations (GEEs), one to test the parents' reports and the other for the UUOs' reports. The GEE framework allowed us to treat observers' ratings across the multiple social situations in the Unfamiliar Peer Paradigm as a repeated-measures variable (Hanley et al., 2003). In

capitalizing on the dependent data structure underlying our criterion variable, using GEE allowed us to boost our effective sample size and thus statistical power to detect effects. For GEE modeling, we used an identity link function with an unstructured correlation matrix, given the small number of dependent variables. In this GEE model, independent observers' ratings served as a nested, repeated-measures (within social context) dependent variable, and we modeled the dependent variable as a function of two factors. We entered a within-subjects Social Context factor (coded SSIT, UCT, and IST), and a between-subjects peer-related impairments factor reflecting the three groups described previously ("0", "1", and "2 or more"). As in prior work (e.g., Alfano et al., 2015; De Los Reyes et al., 2013b; Lipton et al., 2014), we estimated magnitudes of effects for these factors by calculating pseudo-R^2 figures. Specifically, we divided each Wald χ^2 estimate by the summation of all estimates in the GEE model. Further, we sought to examine differences in adolescents' social skills between the peer-related impairment groups. Consistent with prior work (Beale et al., 2018), in the presence of significant between-subjects effects, we conducted follow-up univariate contrasts for differences in adolescent social skills between the "0 peer-related impairments" group and the other groups (i.e., "1" and "2 or more").

Results

Preliminary Analyses

Adolescents' (M = 28.04; SD = 16.14), parents' (M = 27.04; SD = 16.54), and peer confederates' (M = 35.55; SD = 17.51) SIAS reports all displayed acceptable levels of internal consistency; αs of .93, .95, and .96, respectively. Further, all survey and behavioral measures displayed acceptable levels of skewness and kurtosis (i.e., scores < ±2.0). On the SIAS, the patterns of parent-adolescent (.39, $p < .001$), peer confederate-adolescent (.42, $p < .001$), and parent-peer confederate (.30, $p < .001$) correlations were consistent with prior work (e.g., Deros

et al., 2018; Glenn et al., 2019). In fact, in online supplementary material (see Supplementary Table 1), we report results of the PCA we used to integrate multi-informant data on the SIAS. As in prior work (e.g., Kraemer et al., 2003; Makol et al., 2020), these PCA models each revealed factors consistent with the *Trait*, *Context*, and *Perspective* scores as described previously. Relatedly, our χ^2 test of the correspondence between parents' and UUOs' reports about adolescents' peer-related impairments revealed a non-significant and low-magnitude effect, χ^2 (4) = 8.61; Cramer's V = .18; p = .07. Taken together, these preliminary analyses support our approach to integrating multi-informant data to address our study aims, as well as our strategic approach to selecting informants to screen for peer-related impairments.

Links between Reports about Peer-Related Impairments and Referral Status

In Table 1, we reported links between informants' reports of adolescents' peer-related impairments and referral status. For parents' reports, we observed a significant effect of referral status, χ^2 (2) = 61.49; Cramer's V = .70; $p < .001$. We also observed a significant effect for UUOs' reports, χ^2 (2) = 9.45; Cramer's V = .27; $p < .01$. To understand the nature of these effects, Table 1 includes adjusted standardized residuals (ASRs), which function much like *z*-scores and thus help us interpret the nature of these effects (for further information on interpreting ASRs, see Haberman, 1978). What the ASRs reveal is that, although we identified significant links between both parents' and UUOs' reports about peer-related impairments and adolescents' referral status, parents' reports were far superior in their ability to distinguish adolescents on referral status. Specifically, parents' reports were nearly three times better than UUOs' reports in specifically detecting community control adolescents without peer-related impairments (ASR = 6.5 vs. 2.3), and nearly 2½ times better than UUOs' reports in sensitively detecting clinic-referred adolescents with peer-related impairments (ASR = 7.6 vs. 3.1).

Links between Reports about Peer-Related Impairments and Social Anxiety Symptoms

In Table 2, we report ANOVAs testing links between adolescents' peer-related impairments and survey reports of adolescent social anxiety, as reflected by the SIAS *Trait* score. Although we observed significant omnibus effects for both parents' reports and UUOs' reports, follow-up univariate contrasts using Dunnett's *T*3 tests (i.e., to account for inequality of variances) revealed differences in performance similar to those observed with our referral status findings. Specifically, parents' reports (and not UUOs' reports) distinguished adolescents across multiple levels of peer-related impairments (i.e., both 2 vs. 0 and 1 vs. 0).

Links between Reports about Peer-Related Impairments and Observed Social Skills

In Table 3, we report the GEE model for UUOs' reports, which revealed significant effects for both context (pseudo-R^2 = 68.54%) and group (pseudo-R^2 = 31.46%). The context effect reflected adolescents displaying significantly lower observed social skills during the UCT, relative to both the SSIT (estimated marginal means [*EMM*s] = 3.16 vs. 3.76; $p < .001$) and IST (*EMM*s = 3.16 vs. 3.69; $p < .001$). The significant group effect reflected adolescents in the "2 or more peer-related impairments" group displaying significantly lower observed social skills, relative to adolescents in the "0 peer-related impairments" group. The "1 peer-related impairment" group did not significantly differ from the "0 peer-related impairments" group.

For parents' reports, GEE analysis revealed a significant effect for context (Wald $\chi^2 = 41.49$; pseudo-R^2 = 89.48%; $p < .001$) and a non-significant effect of group (Wald $\chi^2 = 4.88$; pseudo-R^2 = 10.52%; $p = .09$). As in the model examining effects for UUOs' reports, the context effect reflected adolescents displaying significantly lower observed social skills during the UCT, relative to both the SSIT (estimated marginal means [*EMM*s] = 3.13 vs. 3.71; $p < .001$) and IST (*EMM*s = 3.13 vs. 3.62; $p < .001$). Because we did not observe a significant omnibus effect of

group, we avoided making interpretations of univariate effects for this factor.

Discussion

Main Findings and Implications

In this study, we advanced the literature on short screening assessments for peer-related impairments linked to adolescent social anxiety. We made two findings. First, parents' reports about adolescents' peer-related impairments performed best when distinguishing adolescents on referral status, and predicting estimates of adolescent social anxiety taken using the latest evidence-based procedures for integrating multi-informant data. Second, UUOs' reports about adolescents' peer-related impairments performed best when predicting adolescents' social skills, based on trained independent observers' ratings about how adolescents behaved within a well-established set of simulated interaction tasks with unfamiliar, same-age peers.

These findings have important implications for research, theory, and practice. Consistent with the Needs-to-Goals Gap framework (De Los Reyes et al., 2022b) and the notion of situational specificity (Achenbach et al., 1987), our findings suggest that adolescents display behaviors indicative of peer-related impairments in different ways, depending on the social context. Contexts vary in terms of their contingencies or specific circumstances that elicit clinically impairing behaviors (see also Skinner, 1953). Along these lines, informants like parents and UUOs vary in their expertise for reporting about peer-related impairments. Our preliminary analyses revealed substantial discrepancies between parents' and UUOs' reports. A logical extension of these discrepancies is that they should optimize the prediction of clinical indices (see also De Los Reyes et al., 2022a; Kraemer et al., 2003; Makol et al., 2020). Stated another way, if informants each provide psychometrically sound reports, then informant discrepancies reflect the reality that each informant's report harbors unique abilities to predict

different kinds of clinically relevant indices (see also De Los Reyes et al., 2015, 2019b). Yet, it is important to consider that our findings conflict with long-held notions in the multi-informant assessment literature, namely the idea that there exist "optimal informants" for assessing specific domains (e.g., teachers for ADHD vs. parents for anxiety; see De Los Reyes et al., 2022b). Our findings indicate that to follow such a notion reduces one's ability to collect the necessary data to connect information about clients' impairments to crucial aspects of service delivery.

In fact, our findings are in line with recent work on adolescent social anxiety assessments generally, which finds that both home- and non-home-based informants all contribute to the prediction of clinically relevant behaviors (see Makol et al., 2020). Our findings build on this work in two ways. First, we discovered that this observation extends to use of both home- and non-home-based informants when assessing peer-related impairments, which commonly manifest among adolescents who experience social anxiety (e.g., Beale et al., 2018; Cannon et al., 2020; Hofmann et al., 1999). Second, we also observed specific kinds of clinical indices for which these informants' reports might be particularly well-suited to predict. Specifically, parents' reports about adolescents' peer-related impairments were able to both sensitively identify clinic-referred adolescents and specifically detect adolescents who were not clinic-referred (i.e., community control adolescents). This link between parents' reports and referral status makes sense in light of parents playing a key role in the seeking out clinical services on behalf of youth (see Hunsley & Lee, 2014). Conversely, UUOs' reports (and not parents' reports) about adolescents' peer-related impairments predicted independent observers' ratings of adolescents' social skills within laboratory tasks designed to simulate social interactions that parents are not well-suited to observe (i.e., interactions with unfamiliar, same-age peers; see also Smetana, 2008). In essence, whereas parents appeared to be in a better position than UUOs to

provide reports about peer-related impairments that link impairments to anxiety-related needs, UUOs were in a better position than parents to provide reports that predict behaviors linked to therapeutic services for these needs (i.e., social skills). Thus, our findings support the idea that short screening devices developed to estimate socially anxious adolescents' peer-related impairments ought to be completed by parents as well as informants who have the ability to observe adolescents in clinically relevant circumstances germane to peer-related impairments.

In terms of the clinical implications of our study, our findings speak to the need for service professionals to gather information about adolescents' peer-related impairments from informants beyond parents. In particular, these informants ought to have the opportunity to not only observe the adolescent in a non-home setting, but do so within ecologically valid conditions (e.g., social interactions with unfamiliar peers) and from the perspective of someone who is unfamiliar to the adolescent. In this way, service professionals leverage informants whose perspectives not only differ from one another but also provide complementary information about adolescents' peer-related impairments. The Unfamiliar Peer Paradigm as implemented in this study provides one example for how service professionals may refine their evidence-gathering processes germane to understanding the peer-related impairments of adolescent clients. Indeed, the tasks that comprise this paradigm were developed to harbor the "look and feel" of evidence-based techniques central to social anxiety treatments, namely therapeutic exposures (see Alfano & Beidel, 2011; Cannon et al, 2020). As such, service professionals might assess peer-related impairments within the service setting using a modified version of the exposure procedures they already implement with clients. Following a client's exposure, service professionals could task a staff member within their service setting to observe video recordings of the client, and complete the three-item peer-related impairments scale used in this study, similar to the procedures we followed with UUOs in

the current study. In these respects, these procedures harbor a high degree of feasibility, in that they rely on (a) techniques already used in therapy to address adolescents' needs and (b) informants to make ratings without training to do so. Thus, we recommend further research on the clinical feasibility of our approach and its adaptability to routine service settings.

Limitations

Two limitations to our study warrant comment. First, we leveraged UUOs to simulate unfamiliar people's perceptions of adolescents' peer-related impairments. As mentioned previously, a precedent exists in the literature for similar approaches yielding psychometrically sound data when assessing processes relevant to understanding adolescent social anxiety (i.e., safety behaviors; Rezeppa et al., 2021), and with informants other than UUOs (i.e., peer confederates; for a review, see Cannon et al., 2020). At the same time, these UUOs were not peers of adolescents selected out of adolescents' true social environments. Further, as research personnel in a laboratory focused on social anxiety, these UUOs likely had relatively more experience observing or interacting with socially anxious adolescents, relative to unfamiliar people generally. Thus, these UUOs may have been more attuned than unfamiliar people generally to the presence of processes linked to social anxiety, such as safety behaviors. Consequently, we encourage future work seeking to replicate and extend our findings to examine whether our findings generalize to UUOs recruited outside of research settings.

Second, UUOs rated adolescents' peer-related impairments based on how adolescents interacted with research personnel trained to simulate unfamiliar, same-age peers. This approach is consistent with prior work with adolescents (Deros et al., 2018; Glenn et al., 2019; Makol et al., 2020), particularly in terms of our focus on training confederates who could reasonably appear to adolescents as same-age, unfamiliar peers. Yet, our peer confederates were older than

our adolescent participants. Further, although we masked UUOs to key characteristics of the adolescents about whom they provided reports (see online supplementary material), UUOs were not masked to the identity of the research personnel who served as peer confederates. Future work should test UUOs' ratings of adolescents within interactions with age-matched peers.

Concluding Comments

Adolescents who experience social anxiety concerns often display significant peer-related impairments linked to these concerns. Although recent work points to methods for rapid screening of these peer-related impairments using parent reports (Beale et al., 2018), we have a limited understanding on how to leverage multi-informant approaches to assessing impairments. Parents may be optimally positioned to provide reports that can be linked to adolescents' general anxiety-related needs, but not with respect to domains linked to therapeutically targeting these needs (e.g., social skills when interacting with unfamiliar peers). Informed by recent theoretical work on the need for leveraging multi-informant approaches for not only needs assessments but also setting therapeutic goals for services (Needs-to-Goals Gap; De Los Reyes et al., 2022), we learned that informants (UUOs) who (a) have no training on how to rate behavior and (b) have no prior contact with the adolescent can report about peer-related impairments, and in a way that can be directly linked to domains relevant to therapeutically targeting adolescent social anxiety (i.e., social skills when interacting with unfamiliar peers). Screening tools completed by untrained raters capably assess adolescents' peer-related impairments, and reflect how adolescents interact with unfamiliar, same-age peers. Future research ought to examine whether these three peer-related impairment items can be usefully integrated into assessment batteries in routine service settings, based on UUOs' observations of how adolescents interact in exposures designed to simulate interactions with same-age, unfamiliar peers.

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Table 1

Relations between Informants' Reports about Adolescents' Peer-Related Impairments and Referral Status

Peer-Related Impairment Rating (Informant, *n*)	**Clinic-Referred** ***n*** **(%, ASR)**	**Community Control** ***n*** **(%, ASR)**
"0" peer-related impairments (**Parent report**; *n* = 64)	4 (6.3%, -6.5)	60 (93.8%, 6.5)
"0" peer-related impairments (**UUO report**; *n* = 57)	13 (22.8%; -2.3)	44 (77.2%; 2.3)
"1" peer-related impairment (**Parent report**; *n* = 25)	7 (28%, -0.6)	18 (72%, 0.6)
"1" peer-related impairments (**UUO report**; *n* = 24)	6 (25%, -1)	18 (75%; 1)
"2+" peer-related impairments (**Parent report**; *n* = 38)	31 (81.6%, 7.6)	7 (18.4%, -7.6)
"2+" peer-related impairments (**UUO report**; *n* = 53)	26 (49.1%, 3.1)	27 (50.9%; -3.1)

Note. Complete data based on parent reports totals 127, given that data collection on this variable began after the start of the study. Values across a row total 100% of scores for that value (e.g., 100% of all parents who reported "0" peer-related impairments). **ASR** = adjusted standardized residual; **UUO** = unfamiliar untrained observer.

Table 2

Relations between Informants' Reports about Adolescents' Peer-Related Impairments and Integrated Multi-Informant Estimates of Adolescent Social Anxiety

Peer-Related Impairment Rating, Parent Report	**SIAS Trait Score *M* (*SD*)**	**Peer-Related Impairment Rating, UUO Report**	**SIAS Trait Score *M* (*SD*)**
"0" peer-related impairments (n = 63)	-0.40 (0.78)	"0" peer-related impairments (n = 55)	-0.22 (0.96)
"1" peer-related impairments (n = 24)	0.03 (0.90)	"1" peer-related impairments (n = 24)	-0.31 (0.49)
"2+" peer-related impairments (n = 38)	0.65 (1.07)	"2+" peer-related impairments (n = 33)	0.37 (1.10)
Omnibus Effect	$F(2, 122) = 16.19$; $p < .001$	**Omnibus Effect**	$F(2, 129) = 6.58$; $p < .01$
Univariate Contrast, 0 vs. 1	$p < .05$	**Univariate Contrast, 0 vs. 1**	$p = .83$
Univariate Contrast, 0 vs. 2	$p < .001$	**Univariate Contrast, 0 vs. 2**	$p < .01$

Note. **SIAS** = Social Interaction Anxiety Scale; **UUO** = unfamiliar untrained observer. Complete data based on parent reports totals 125, given that data collection on this variable began after the start of the study and two peer confederates did not complete SIAS reports. Complete data based on UUO reports totals 132, given that two peer confederates did not complete SIAS reports.

Table 3

Generalized Estimating Equation (GEE) Predicting Observed Social Skills as a Function of Social Interaction Context and Number of Adolescent Peer-Related Impairments Reported by Unfamiliar Untrained Observers

Main GEE Model Effects			
Factor			**Type III Wald X^2**
Context			45.59*
Peer-Related Impairments			20.93*
Parameter Estimates for Factor Contrasts			
Variable (Contrast)	***M(SE)***	***M(SE)***	**Mean Difference in Pairwise Comparison**
Peer-Related Impairments (2 vs. 0)	3.11 (0.12)	3.83 (0.11)	-0.73*
Peer-Related Impairments (1 vs. 0)	3.66 (0.13)	3.83 (0.11)	-0.17

Note. Factor contrasts based on comparisons of factors in descending order. The Context factor (coded in ascending order) was coded 0 = Simulated Social Interaction Test, 1 = Unstructured Conversation Task, and 2 = Impromptu Speech Task. The Peer-Related Impairments factor (coded in ascending order) was coded 0 = No reported impairments; 1 = One reported impairment; and 2 = Two or more reported impairments; *p<.001.

Assessing Peer-Related Impairments Linked to Adolescent Social Anxiety: Strategic Selection of Informants Optimizes Prediction of Clinically Relevant Domains

ONLINE SUPPLEMENTARY MATERIAL

Description of Tasks within the Unfamiliar Peer Paradigm

The Unfamiliar Peer Paradigm consists of a series of counterbalanced social interaction tasks designed to simulate how adolescents react to social interactions with same-age, unfamiliar peers. The interaction tasks within the Unfamiliar Peer Paradigm included a Simulated Social Interaction Test (SSIT), Unstructured Conversation Task (UCT), and Impromptu Speech Task (IST). The SSIT mimics social situations that may elicit stress in an individual while interacting with a peer who initiates conversation and includes a series of five role-playing scenes. Each scene was of one-to-three minutes' duration and involved such social situations as offering/accepting assistance, giving/receiving a compliment, and responding to inappropriate behavior as facilitated by the peer confederates with whom adolescents interacted. The UCT simulated how an individual may interact with a peer during an extended period after being required to initiate conversation. Research personnel prompted adolescents to interact with a peer confederate for three minutes with the instruction to pretend it was their first day at a new school and they did not know anyone at the school. Within the UCT, we trained peer confederates to respond neutrally and let the participant lead the conversation. In the IST, adolescents were allotted three minutes to prepare to deliver a 10-minute speech to an audience consisting of two trained, unfamiliar peer confederates and the task administrator. Assigned speech topics consisted of topics not typically discussed by adolescents (i.e., politics, public health). If after 3 minutes an adolescent wished to terminate their speech, we permitted them to do so.

Characteristics of Unfamiliar Untrained Observers (UUOs)

Demographics. A set of 45 UUOs made reports of adolescents' peer-related impairments. These 45 UUOs had a mean age of 19.96 years (*SD* = 1.61 years) and included 36 females and 9 males. The UUOs self-identified their racial/ethnic background as African

American or Black (11.1%); Asian American or Asian (33.3%); Hispanic or Latino/a (Spanish) (15.6%); White, Caucasian American, or European (48.9%); American Indian or Native American (2.2%); or "other" (i.e., Middle Eastern, Iranian; 4.4%) (rates total above 100% because UUOs could select multiple response options). The 45 UUOs self-reported their current educational status at the time they completed their reports as an undergraduate freshman (13.3%), sophomore (40%), junior (17.8%), senior (15.6%); a post-baccalaureate trainee (i.e., not yet matriculated in a graduate program; 4.4%); or a master's level graduate student (8.9%).

Characteristics and Procedures for gathering UUO reports. The UUOs who made reports about adolescents' peer-related impairments consisted of research personnel who volunteered in the laboratory and site of data collection. The UUOs typically made these reports within the first few weeks of joining the laboratory. In this respect and in several other ways, we selected UUOs and assigned them to videos of adolescents, such that we could ensure their unfamiliarity with the adolescents about whom they provided reports. Specifically, based on archival videos of the 134 adolescents' participation in the Unfamiliar Peer Paradigm, we randomly assigned UUOs to each observe the video recordings of up to three adolescents. The number of recordings a UUO viewed was determined by how late into the dataset they were assigned videos. That is, UUOs who completed less than three reports did so largely because by the time they were assigned videos, all other adolescents had been rated by other UUOs. After viewing each recording, a UUO made reports for every adolescent they observed. We masked the UUOs to all clinical characteristics of the adolescents about whom they provided reports, including referral status and all clinic data (e.g., scores on other instruments). Further, UUOs did not participate as a peer confederate with the adolescents about whom they provided reports. In this respect and similar to our procedures for peer confederates, UUOs had no prior contact with

the adolescents about whom they provided reports.

Characteristics and Training of Independent Observers

For each adolescent, two trained independent observers viewed archived videotapes of their participation in the Unfamiliar Peer Paradigm. All trained independent observers received training on how to use the behavioral ratings of adolescent social skills. Trained independent observers consisted of post-baccalaureate and undergraduate research assistants. We masked trained independent observers to adolescents' referral status and they did not have access to adolescents' clinical information. Further and as with the UUOs, none of the trained independent observers participated as a peer confederate in the Unfamiliar Peer Paradigm.

To train independent observers on the coding scheme described below, a team of eight to ten researchers (i.e., undergraduate students, post-baccalaureate research assistants, graduate students, and faculty) participated in consensus coding meetings in which team members simultaneously viewed videos of all the social interaction tasks (i.e., SSIT, UCT, IST) performed by five adolescent participants in the sample. Following each task viewing, team members independently rated the adolescent in the video on the levels of social skills they displayed during the task, using the coding scheme below (i.e., a rating for each of the five SSIT role-plays, a rating for UCT, a rating for IST). After each team member made their ratings for a task, the entire team discussed the ratings. During this discussion, the team resolved discrepancies among ratings, and came to a final consensus rating for social skills displayed by the adolescent participant performing the task. We repeated this process for each of the five participants across all seven tasks (i.e., seven social skills consensus ratings per participant).

After creating the consensus ratings for five training cases, we trained the independent observers described previously. Each trained independent observer independently viewed videos

for the five training cases and made seven social skills ratings per case. After making their training ratings, we calculated intraclass correlation (ICC) statistics to assess inter-rater reliability between each trained independent observer and the consensus ratings. We set a threshold of a mean ICC of .80 to determine whether a trained independent observer successfully passed the training stage. All trained independent observers passed our criterion ICC, and following training, these observers coded the cases in the sample to which they were assigned.

Data-Analytic Plan

Preliminary Analyses

Integrating Multi-Informant Assessments of Social Anxiety. We leveraged a multi-informant approach to assessing social anxiety that included reports completed by adolescents, parents, and peer confederates. As in other areas of multi-informant assessment (for a review, see De Los Reyes et al., 2019), SIAS reports from these informants commonly yield discrepant estimates (e.g., Deros et al., 2018). To optimize prediction of criterion variables using these discrepant data, we leveraged an integrative approach developed by Kraemer and colleagues (2003) that involves repurposing a long-used data aggregation technique for analyzing variations among survey items—principal components analysis (PCA; Nunnally & Bernstein, 1994)—to instead model multi-informant data. This approach involves synthesizing informants' reports into sources of variability informed by prior work (see Achenbach et al., 1987; De Los Reyes et al., 2013a, 2015). First, *context* variation reflects the environment in which the informant observes the youth about whom they make ratings. Second, *perspective* variation reflects whether the report comes from an observer or self-rater. Third, *trait* variation reflects concerns that manifest across informants' contexts and perspectives. Using PCA, we identified these three sources of variability by examining component weights, consistent with Kraemer and colleagues.

We used a set of informants who collectively varied in their contexts and perspectives, with (a) informants observing from a home-based, observer perspective (parents); (b) informants observing from a non-home-based, observer perspective (peer confederates); and (c) informants observing from a self-perspective and based on a mix of home and non-home contexts. As such, we expected our PCA to include a *Trait* score component in which all informants' reports load strongly and in the same direction. We also expected our PCA to reveal a *Context* score (i.e., informants from different contexts load in opposite directions) as well as a *Perspective* score (i.e., self-reports load in the opposite direction of observer informants' reports). Consistent with Kraemer and colleagues (2003) and recent work by Makol and colleagues (2020), we conducted an unrotated PCA, using the three "SIAS items" (i.e., the total scores of parent, adolescent, and peer confederate SIAS reports). In this respect, our subject-to-item ratio (i.e., 134/3 = 44.67:1) was well above the typical subject-to-item ratios deemed "large" within PCA modeling contexts (e.g., 20:1; see Osborne & Costello, 2004). Within this unrotated PCA, we set the number of components to be extracted to three. We examined principal component weights for each informant's report to determine whether we identified trait, context, and perspective scores described previously. Makol and colleagues found that the *Trait* score yielded optimal prediction of criterion variables, an observation consistent with Kraemer and colleagues' notions as to the value of this approach. Thus, we used the SIAS *Trait* scores for tests of our hypotheses. We also computed bivariate correlations among all informants' reports on these measures.

Supplementary Table 1

Principal-Component Analysis (PCA) of Multi-Informant Reports on the Social Interaction Anxiety Scale (SIAS)

Informant	Trait	Context	Perspective	Sources of Variability in Informant's Report
SIAS (*n* = 132)		**Component Weight**		
Parent	0.73	0.63	0.27	Home (context), Other (perspective)
Adolescent	0.81	-0.06	-0.59	Home and Non-home (context), Self (perspective)
Peer Confederate	0.75	-0.55	0.37	Non-home (context), Other (perspective)
Eigenvalue	1.75	0.70	0.56	
Variance attributable to component	58.24%	23.25%	18.52%	

Note. PCA conducted with participants for whom we had full data across informants' SIAS (parent, adolescent, and peer confederate; *n* = 132) reports. Kraemer et al. (2003) described the following criteria for each component: *Trait* (all three informants' reports load strongly and in the same direction), *Context* (informants from different contexts load in opposite directions) and *Perspective* (self-reports load in the opposite direction of observer informants' reports).