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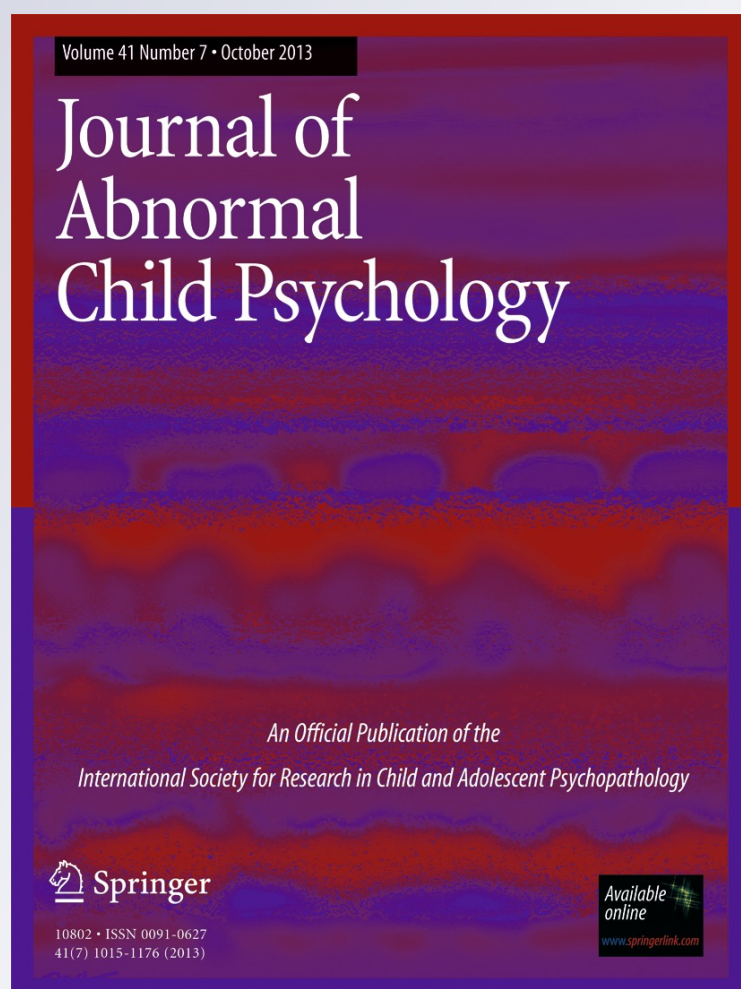
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Continuities and Changes in the Friendships of Children with and Without ADHD: A Longitudinal, Observational Study

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Abstract We examined how the real-life dyadic friendships of 87 children with ADHD and 46 comparison children (76 % boys) aged 7–13 years evolved during a 6-month follow-up period. The methods included friendship quality self-report measures and direct observation of friends' dyadic behaviors in three structured analogue tasks. At Time 2, the friends of the participants with ADHD reported less positive friendship quality and more conflict with their friends than at Time 1. They were also considerably less satisfied with their friendship than 6 months prior. In contrast, the friends of comparison children reported fewer negative friendship features, more positive friendship features and a slightly greater friendship satisfaction than at Time 1. In sharp contrast with the invited friends' reports, referred children with ADHD did not report deterioration in their friendship quality over time. Unlike comparison children who significantly reduced violations of game rules between Time 1 and Time 2, children with

ADHD broke more game rules during the same period. In negotiating with friends, comparison children, but not children with ADHD, reduced the number of self-centered and insensitive proposals at Time 2. Controlling for Time 1 variance, violations of game rules and a self-centered, insensitive negotiation approach predicted deterioration in friendship quality for children with and without ADHD over time.

Keywords ADHD · Friendship · Longitudinal design · Observational study

Impaired relations with peers are endemic among children with ADHD and a chronic source of frustration for professionals attempting to help them. Existing interventions such as psychopharmacology, social skills training and parent training have not succeeded consistently in improving the

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peer relationships of children with ADHD (Hoza, Gerdes et al. 2005; Mrug et al. 2012). Having a close friend, as opposed to being generally accepted in larger groups, is associated with well-being (Bagwell and Schmidt 2011) and is known to buffer the otherwise negative effects of several forms of psychosocial risk (e.g., Bagwell and Schmidt 2011). The benefits of friendships may depend on their quality. Berndt (1996) defines friendship quality in terms of the positive (e.g., intimacy, caring and support) and negative (e.g., conflict and aggression) features that characterize a friendship. Friendship quality is negatively related to maladaptive behaviors, internalizing problems, and school maladjustment. In contrast, stable, high-quality friendships are associated with later social adjustment (Bagwell and Schmidt 2011; Ladd et al. 1996). There has been almost no longitudinal research on the ways in which continuing friendships change over time either in diagnosed or non-diagnosed populations.

Theorists interested in adult friendship have proposed models predicting the trajectory of friendship quality within continuing friendships. In Levinger's (1980) five-stage model, relationships proceed from superficial attraction to the discovery of common ground, then to consolidation of the relationship with greater emotional investment and commitment. Progression to the fourth and fifth stages—deterioration and termination—depends in part on the friends' ability to resolve their inevitable conflicts. Fehr (1995) adds that continuing to enjoy spending time together and sharing common pastimes remain important in weathering the test of time. Children's friendships may undergo many of the same transformations, although there has been virtually no parallel theory-building specific to childhood or adolescence. One strong predictor of friendship stability is a "reservoir" of positive friendship attributes from the early stages on (e.g., Fonzi et al. 1997). Conflicts are inevitable and frequent in children's friendships but are usually resolved quickly in friendships that continue (Bagwell and Schmidt 2011). Selman et al. (1997), in their writings on children's interpersonal understanding, imply that the friendships of children who display antisocial behavior need to be nurtured until they move from superficial initial stages to a mutual sense of shared intimacy.

The core symptom dimensions of ADHD may interfere with harmonious friendships (Mikami 2010; Normand et al. 2007). Inattention may impair the ability of children to attend to important social information such as the needs, wishes, and feelings of the friend. This may impede reciprocity, sensitivity, conflict resolution, and commitment. Hyperactivity and impulsivity may result in being overbearing, insensitive and emotionally charged. Not surprisingly, children with ADHD are almost twice as likely as comparison children to have no friends (Hoza, Mrug et al. 2005). Furthermore, their friendships may be of short duration (e.g., Marton et al. 2012) and of poor quality (Normand et al. 2011). Unfortunately, previous

researchers have reported neither observational data of interactions with real-life friends nor friendship ratings by the friends of children with ADHD. The exclusive reliance on self-reports is problematic because researchers typically find minimal concordance between ratings of friendship by children with ADHD and other reliable sources of information (e.g., Hoza, Mrug et al. 2005). Observational methods can provide rich data about children's interactions with friends, while also allowing for fine-grained assessments of behavioral change over time.

In their recent cross-sectional multimethod study, Normand and colleagues (2011) provided detailed information, including observations of dyadic interaction, about the friendships of children with and without ADHD aged 7–13 years. Children with ADHD perceived fewer positive features and more negative features, and were less satisfied in their friendships than were non-diagnosed peers. Children with ADHD performed more illegal maneuvers than comparison children in a fast-paced competitive game. While negotiating with their friends, children with ADHD made more insensitive and self-centered proposals than comparison children. In dyads consisting of one child with ADHD and one nondisordered friend, children with ADHD were often more controlling than their friends. There were no significant differences in any friendship questionnaire or observation variables between dyads in which there was only one vs. those with two children with ADHD (i.e., mixed dyads vs. ADHD/ADHD dyads). It remains, however, possible that, over time, dyads with two children having ADHD will develop mutually reinforced patterns of maladaptive behaviors, ultimately leading to friendship termination. On the other hand, it is possible that children in ADHD/ADHD dyads develop over time a strong tolerance for maladaptive mannerisms, enabling them to remain together.

The current study focuses on the six-month follow-up of the friendship data first documented in Normand et al. (2011). Our main objective was to examine how the friendships of children with ADHD and comparison children evolved over time. Our hypotheses were based largely on Sagvolden et al. (2005)'s dynamic developmental theory of ADHD, which suggests that ADHD is first due to a limited delay-of-reinforcement gradient. This could impair one's ability to associate socially appropriate behaviors with their naturally occurring positive social consequences. Dysfunctional extinction processes may also explain why children with ADHD often continue to exhibit socially inappropriate behaviors in social contexts despite the presence of negative social consequences. These impaired reinforcement and extinction mechanisms could result in the failure by children with ADHD to learn from experience, to profit from the reinforcements provided by close friends for appropriate relationship-enhancing behaviors or to learn from the corrective feedback that friends provide to resolve conflicts.

Making things worse, children with ADHD may have difficulty gauging the appropriateness of their behaviors in the friendship context, believing their behaviors to be more positive than they really are (i.e., positive illusory bias; Owens et al. 2007). These overly positive self-perceptions may limit the ability of children with ADHD to learn from their mistakes and alter their future behavior.

Hypotheses

Stability of Friendship (a) We expected that significantly fewer children with ADHD would keep their initial friends than comparison children over time.

Children's Reports on Their Friendship Quality (b) We expected that the negative friendship features of the referred children with ADHD would increase over time and that their positive friendship features and satisfaction with their friendships would decrease, with the reverse pattern occurring in the friendships of the comparison group; (c) Similarly, we expected that the friends of children with ADHD would report increased negative friendship features in comparison with their Time 1 reports, fewer positive friendship features and less satisfaction with the friendship than the friends of comparison children.

Interactions Between Friends (d) In a fast-paced competitive car-race task, we expected that referred children with ADHD would commit more rule violations than comparison children. (e) When negotiating with friends, we expected that referred children with ADHD would make more self-centered and insensitive proposals, would make fewer inquiries of their friends' preferences, would refuse more of their friends' proposals, and would be more likely to be involved in dyads where the power is unequally balanced than would comparison children. (f) We expected that children with ADHD would demonstrate more negative emotional reactions than would comparison children. We predicted that these group differences would increase over time for hypotheses (d) to (f).

Composition of Dyads (g) We also expected that dyads comprising two children with ADHD would have more friendship problems than ADHD/non-ADHD dyads (i.e., mixed dyads) on all friendship measures and that these differences would increase over time.

Longitudinal Predictors of Friendship Quality and Satisfaction (h) We anticipated that violations of game rules and a self-centered, insensitive negotiation approach predicted deterioration in friendship quality for children with and without ADHD over time.

Method

Participants

We recruited 133 referred children and their respective 133 invited friends from pediatric clinics, ADHD clinics, and community schools in the Ottawa-Gatineau area over a two-year period. Of the referred children, 87 children had a diagnosis of ADHD (67 boys) and 46 without diagnosis constituted our comparison group (34 boys). All referred children were between 7 and 13 years old ($M=7.60$; $SD=0.92$ at Time 1). We asked each referred child to invite his/her best friend, with parent permission, to participate in two research sessions, 6 months apart. Of the referred children, 125 (94.0 %) came with a same-sex friend. Their average age was 10.33 years ($SD=1.92$); 198 of the participants (74.4 %) were boys. French was the language of instruction of 230 (86.5 %) of the participants. Whereas the sample mainly consisted of Caucasian children ($n=214$; 90.6 %), other cultural backgrounds included Latin-American ($n=9$; 3.4 %), Arabic ($n=7$; 2.6 %), African ($n=5$; 1.9 %), and Asian ($n=4$; 1.5 %). A total of 211 (79.3 %) of the participants were living in two-parent households. The median yearly family income was \$81,000 (range=\$43,709 to \$129,840). We refer herein to four groups of participants: (1) "children with ADHD" denotes children with ADHD who were directly referred to the study; (2) "comparison children" denotes children without ADHD who were also referred; (3) "friends of children with ADHD" were invited by the children with ADHD; and (4) "friends of comparison children" were invited by children without ADHD. There were 22 ADHD/ADHD dyads (7 girls) and 65 "mixed" dyads (13 girls) at Time 1, whereas there were 14 ADHD/ADHD dyads (4 girls) and 51 "mixed" dyads (8 girls) at Time 2.

Both informed parental consent and child assent were required. Inclusion criteria for children with ADHD were: (a) a previous diagnosis of ADHD by a qualified health care professional; and (b) *both* parent and teacher ratings containing at least one *T*-score at or above 65 on *either* the DSM-IV Inattention *or* Hyperactivity subscale of the Conners Rating Scale-Revised: Long Form (CRS-R:L; Conners et al. 1998a, b). Because many medicated children with ADHD continue to show impairment in their peer relationships (Hoza, Gerdes et al. 2005), these children were not excluded or asked to suspend their medication. In our clinical sample, 60 out of 87 of children with ADHD (69.0 %) were medicated at Time 1; 45 of the 65 children with ADHD who came at Time 2 were on medication (69.2 %). All medicated children with ADHD at Time 1 maintained their medicated status at Time 2. Participating children were offered a \$20 stipend for each 90-minute research session.

We recruited the comparison group from local schools and community organizations from the same catchment areas served by the clinics. For inclusion in the comparison group, parent and teacher *T*-scores had to be below 60 on the DSM-IV ADHD subscales. Parents of comparison children reported no previously diagnosed psychological disorders. In the ADHD group, mean ADHD symptom Conners *T* scores and *SD*s were as follows: parent ratings (multivariate $F(2,130)=180.91$, $p<0.001$, partial $\eta^2=0.74$; DSM-IV Inattention $M=73.86$, $SD=8.65$, compared to $M=46.96$, $SD=5.64$ for the comparison group, $F(1,131)=362.94$, $p<0.001$, partial $\eta^2=0.74$; DSM-IV Hyperactivity $M=71.37$, $SD=13.67$, compared to $M=47.76$, $SD=4.44$ for the comparison group, $F(1,131)=129.60$, $p<0.001$, partial $\eta^2=0.50$); Teacher ratings (multivariate $F(2,122)=58.62$, $p<0.001$, partial $\eta^2=0.49$; DSM-IV Inattention $M=64.66$, $SD=10.94$, compared to $M=46.42$, $SD=5.02$ for the comparison group, $F(1,123)=111.66$, $p<0.001$, partial $\eta^2=0.49$; DSM-IV Hyperactivity $M=61.82$, $SD=13.75$, compared to $M=45.71$, $SD=4.17$ for the comparison group, $F(1,123)=58.55$, $p<0.001$, partial $\eta^2=0.32$).

Exclusion criteria included previously administered full-scale IQ less than 80 (available in the clinical charts for 77 % of the children with ADHD, not available for the comparison group). For the ADHD group, whose clinical records were available, we also excluded children with pervasive developmental disorder or psychosis. We excluded from both groups children not enrolled in a regular classroom. Twenty-nine potential members (27 children with ADHD and 2 comparison children), not included in the 133 participants reported above, could not participate because they reported that they had no friends. Common ADHD comorbidities (e.g., oppositional defiant disorder, conduct disorder, learning disabilities, anxiety disorders) were not excluded to promote generalizability. According to the information available in the medical/clinical charts, 17 (19.5 %) referred children with ADHD also had a learning disability, 13 (14.9 %) also had an oppositional defiant disorder, 2 (2.2 %) also had an anxiety disorder, and 1 (1.1 %) also had an attachment disorder. There were no significant differences between the referred ADHD and comparison groups in most demographic variables, including age, grade, children's sex, parent's sex, ethnicity, SES, and median annual family income (see Normand et al. 2011, Table 1). The median annual family income of the ADHD (\$79,750) and comparison (\$79,160) groups was virtually identical to the 2010 Ontario (\$79,050; Statistics Canada, 2012). However, children with ADHD were slightly more likely than comparison children to be instructed in English, 19.5 % vs. 4.3 %; $\chi^2(1,133)=5.67$, $p=0.02$, Cramer's $V=0.21$, and to live in single-parent households, 26.4 % vs. 8.7 %; $\chi^2(1,133)=5.85$, $p=0.02$, Cramer's $V=0.21$.

According to Conners parent ratings, children with ADHD (e.g., *M T* score=68.75) were also significantly more impaired in their peer relations than comparison children (*M T* score: 48.87), $F(1,131)=86.59$, $p<0.001$, partial $\eta^2=0.40$.

Participant Retention The retention rate between Time 1 and Time 2 was 87 %. There was a significant difference between children with ADHD and comparison children in retention rate: 96 % ($n=44$) percent of comparison children participated in both research sessions, whereas only 82 % ($n=71$) of children with ADHD did so, $\chi^2(1,133)=5.07$, $p=0.02$, Cramer's $V=0.20$. There was no significant difference in retention between ADHD/ADHD dyads ($n=16/22$, 73 %) vs. ADHD/non-ADHD (mixed) dyads ($n=55/65$, 85 %). Among the 18 referred participants who did not attend the follow-up session, 89 % ($n=16$) had ADHD. Reasons for not coming to the second research session were diverse: 8 parents did not provide a reason (including 6 parents of referred children with ADHD), 4 parents of referred children with ADHD indicated that it was too difficult to organize a session, 3 referred children with ADHD moved away, 2 parents of referred children with ADHD reported that their child lost his/her friend and had no other friend to participate with, and 1 parent was not interested anymore. Among the 115 referred children who participated at both time points, 4 participants (ADHD, $n=3$; comparison, $n=1$) came with a new friend at Time 2 and were excluded from the analyses, resulting in a sample of 111 referred children. Consistent with the criteria for mutual friendship proposed by Bukowski and Hoza (1989), 4 other dyads were eliminated because one or both participants failed to nominate the partner as a reciprocal friend at Time 2. Therefore, a total of 107 eligible dyads of reciprocal friends were included in the longitudinal analyses; 5 (4.7 %) of these dyads included different-sex friendships. There were no significant differences in the Time 1 friendship, attention-deficit or demographic data between the participants who came to both research sessions with their initial, reciprocal friend ($n=107$) and those without friendship follow-up data ($n=26$), except that referred children who only participated in the first research session were more likely to live in one-parent families (35 %) than those who came to both research sessions with the same reciprocal friends, 17 %, $\chi^2(1,333)=4.09$, $p=0.04$, Cramer's $V=0.18$.

Measures

Conners Parent and Teacher Rating Scales-Revised—Long Forms (CPRS-R:L and CTRS-R:L) The well-validated CPRS-R:L and CTRS-R:L (Conners et al. 1998a, b) were used to assess symptoms of ADHD and other disruptive behaviors.

Table 1 Definitions of car-race task categories, inter-rater reliability and intra-class correlations (between dyadic friends)

Category	Definition	Inter-rater reliability (kappa): T1/T1, T1/T2, T2/T2	Intra-class correlations: T1, T2
Compliance with rules			
Legal maneuvers	All legal maneuvers including: Avoiding contact with the partner's car legally (e.g., pulling one's car backwards; waiting the partner before entering the runway); making contact with the partner's car without breaking any rules; car and blocks in proper position at times of loading and unloading.	0.87, 0.80, 0.80	0.29, 0.30
Illegal maneuvers	All illegal maneuvers including: Avoiding contact with the partner's car by breaking the rules (e.g., lifting one's car in the air); making contact with the partner's car while one's own car is in an illegal position (e.g., driving up the sides of the runway); infraction of rules during loading or unloading.	0.82, 0.78, 0.76	0.15, 0.06
Affect			
Positive	The extent to which members of the dyad expresses nonverbal and verbal positive affect, including positive facial expressions and laughter. 1–3 rating [1= <i>the child is smiling for most of the segment</i> ; 3= <i>thoroughly positive with extended bouts of giggling or laughter</i>].	0.80, 0.79, 0.88	0.57, 0.48
Negative	The extent to which partners express negativity toward one another or toward the task in their facial affect and speech. Includes orders, threats, reprimands, visible tension and nervousness. 1–3 rating [1= <i>the child is complaining or exhibit some frustration toward the friend or the task</i> ; 3= <i>extensive negative affect expressed vocally or physically at any point in the segment</i>].	0.81, 0.84, 0.84	0.05, 0.04
Neutral	The extent to which partners manifest neutral affect for most of the segment.	0.88, 0.79, 0.85	0.57, 0.55

T1/T1=Inter-rater reliability at Time 1; T1/T2=Inter-rater reliability between Time 1 and Time 2 coders; T2/T2=Inter-rater reliability at Time 2

Friendship Nominations In order to confirm a reciprocal friendship, participants completed a friendship nomination form. Dyads in which one or both participants failed to nominate his or her partner as a friend were not included in the final analyses (Time 1, $n=11$ dyads; 7 ADHD dyads and 4 comparison dyads, Time 2, $n=4$ dyads; 3 ADHD dyads and 1 comparison dyad).

The Friendship Qualities Measure (FQM; Grotjeter and Crick 1996) is a 43-item rating scale. Based on previous theoretical and empirical evidence (see Berndt 1996, for rationale), we reduced the original 12 subscales to two global factors: Positive friendship features (18 items, $\alpha=0.83$, e.g., “My friend makes me feel important and special”) and negative friendship features (25 items, $\alpha=0.80$; e.g. “My friend gets mad at me a lot”). In order to gauge overall friendship satisfaction, we added two additional items (“How is this friendship going?” “How happy are you with this friendship?”). A 5-point response scale is used.

The Car-Race Task (Fonzi et al. 1997; Normand et al. 2011) is a fast-paced, engrossing game. The goal is to be quicker

than the opponent in transporting small five wooden blocks from one end of the game table to the other. Participants transport the blocks one at a time in the trunk of a toy truck. The truck must travel down a runway from a starting mark to a finish line and back. The runway cannot accommodate both trucks side by side and the rules prohibit the players from lifting their wheels from the runway. A player can thus: (1) compete energetically but without breaking the rules, e.g., by blocking or pushing against the opponent's car; (2) compete in violation of the rules, e.g., by lifting one's own car over the partner's; and/or (3) avoid conflicts with their opponents even if this reduces their own chances of winning, e.g., by going in reverse, allowing one's partner to proceed. Scoring procedures were identical to those used at Time 1.

Card-Sharing and Game-Choice Tasks (Normand et al. 2011). We presented each dyad with 15 trading cards that were appealing to children of both sexes and different ages, featuring sports personalities, cartoon characters and popular artists. We asked the participants to select 5 cards from the initial 15 that they both agreed that they

liked. We then instructed them to decide together how they would share the 5 cards, provided that both parties agreed. We then asked the participants to choose together what board games (e.g., Operation, Piranha Panic, Sonic Skillball, Trouble, etc.) they would play at the end of the session. No time limits were imposed in either task. To code both these tasks, we used categories identical to those used at Time 1. Independent raters also coded the video data for the affect displayed at 5-second intervals, using a scale ranging from positive to neutral to negative. The affect indices represent the rate per minute of each affect category multiplied by its intensity (1, 2 or 3). For example, for negative affect, we first multiplied each negative affect score by its intensity, then, in order to maintain a standard metric regardless of the time elapsed for each task, we calculated the weighted proportion of intervals coded as negative (Although these affect indices permit parsimony in the analyses, they may obscure potential differences in affect frequency or intensity only; see Supplementary Appendix 1 for an alternative analysis designed to provide greater detail in terms of frequency and intensity of affect).

Procedure

At each of the two research sessions, the referred children and their friends were initially separated while different research assistants administered the friendship nominations and the friendship-quality questionnaire. In order to ensure comprehension, the research assistants read each question out loud. We administered all measures in either French or English; there were no mixed French-English-dominant dyads. These tasks were administered in random order and videotaped in a room either at the University or at a local school. The children's negotiation tasks were transcribed for coding purposes. We conducted a total of 24 3-hour training sessions using a detailed coding manual. We reviewed the coding rules, checked reliability, and provided feedback on accuracy in each training session. Once criterion reliability (inter-rater 80 % of agreement) was reached, formal coding started using the Noldus Observer XT (Version 7). To minimize coding drift, ongoing monthly training sessions were organized and post-training reliability was checked weekly. The trained graduate and undergraduate students were not informed of the identity and diagnosis of the participants, and were blind to the study hypotheses. Other blind coders independently recoded a random sample of 20 % of the sessions in order to establish inter-rater reliability. Definitions of the coding categories, excellent inter-rater reliability data, and the intraclass (i.e., between dyad members) correlations appear in Tables 1 and 2.

Results

Comparisons of Time 1 Behaviors of Time 2 Participants and Non-Participants

We conducted 11 *T*-tests to compare the Time 1 friendship behaviors of participants who did and did not continue through Time 2. Only one of these yielded significant results: Non-returners ($M=0.39$, $SD=0.64$) had higher scores than returners: $M=0.15$, $SD=0.39$; $F(1,131)=6.27$, $p=0.01$, partial $\eta^2=0.05$ at Time 1 for insensitive proposals during the game-choice task. *T*-tests indicated several differences for the friendship-quality questionnaire data. Non-returners ($M=3.71$, $SD=0.66$) perceived fewer positive friendship features than returners, $M=4.05$, $SD=0.58$; $F(1,131)=7.07$, $p=0.01$, partial $\eta^2=0.05$ at Time 1. Non-returners ($M=1.99$, $SD=0.58$) reported more negative friendship features than returners, $M=1.60$, $SD=0.35$; $F(1,131)=19.52$, $p<0.001$, partial $\eta^2=0.13$ at Time 1. Non-returners ($M=4.44$, $SD=0.88$) rated their friendship as less satisfying than returners, $M=4.87$, $SD=0.33$; $F(1,129)=15.98$, $p<0.001$, partial $\eta^2=0.11$ at Time 1. There were no significant differences in the ratings of the invited friends. There was a significant difference between returners and non-returners in balance of power: 59.8 % of the returners were equally balanced at Time 1 compared to 38.5 % of the non-returners, $\chi^2(1,133)=3.86$; $p=0.049$; Cramer's $V=0.17$.

Data Analytic Strategy for Hypothesis Testing

The average intraclass correlations (i.e., between the two friends) for the car-race, the card-sharing, and the game-choice tasks were respectively 0.33, 0.56, and 0.45 at Time 1 and 0.29, 0.32, and 0.40 at Time 2, indicating that the behaviors of each friend were not extensively influenced by the behavior of the other friend at both time points. We therefore conducted the main analyses at the individual level first, allowing for maximum power.

We reduced the 29 original observational variables to 12, by transforming raw frequency variables that were linearly dependent (e.g., numbers of sensitive and insensitive proposals) into a proportion variable (e.g., number of insensitive proposals divided by the total frequency of proposals or percentage of insensitive proposals). We used arcsine-transformed proportions of these observational variables to account for non-normal distribution in all analyses. Raw proportional data (in %) are, however, reported in Table 4 and Fig. 1 to facilitate interpretation.

To test for group differences between the ADHD and comparison groups, we conducted a series of repeated-measures Analyses of Variance (ANOVA). The within-subject variable was Time, as expressed by the Time 1 and

Table 2 Definitions of categories for negotiation tasks, inter-rater reliability and intra-class correlations (between dyadic friends)

Category	Definition	Card sharing task		Game choice task	
		Inter-rater reliability (kappa): T1/T1, T1/T2, T2/T2	Intra-class correlation between dyadic friends: T1, T2	Inter-rater reliability (kappa): T1/T1, T1/T2, T2/T2	Intra-class correlation between dyadic friends: T1, T2
Proposals					
Self/other-interest-based	The extent to which a proposal made by a child favors himself/herself or his/her friend in terms of the number of cards negotiated during this specific proposal. -1 to 1 rating [-1=self-centered proposal; 0=neutral proposal; 1=altruistic proposal]	0.96, 0.80, 0.87	0.45, 0.22	n.a.	n.a.
Sensitivity	The extent to which a proposal made by a child acknowledges and responds to his/her friend's social cues, needs, and preferences. -1 to 1 rating [-1= <i>insensitive proposal</i> ; 0= <i>new proposal</i> ; 1= <i>sensitive proposal</i>]	0.79, 0.79, 0.85	0.64, 0.28	0.81, 0.76, 0.77	0.57, 0.12
Preference					
Expression	Disclosure of personal preferences about the outcome of the negotiations.	0.86, 0.85, 0.85	0.62, 0.21	0.79, 0.84, 0.87	0.17, 0.38
Inquiry	Inquiry about friends' personal preferences about the outcome of the negotiations.	0.83, 0.80, 0.80	0.18, 0.01	0.89, 0.77, 0.84	0.17, 0.09
Responses					
Acceptance	Unqualified acceptance of a proposal.	0.77, 0.81, 0.72	0.25, 0.20	0.89, 0.79, 0.87	0.46, 0.16
Refusal	Total rejection of a proposal.	0.80, 0.81, 0.81	0.47, 0.36	0.77, 0.85, 0.78	0.19, 0.20
Balance of power ^a	The degree to which one partner in the dyad exercises more influence or control during the interaction. Indications of controlling behaviors include choice of cards/game, speech turn-taking, and leader/monitor roles. 0–1 rating 0=[<i>equal balance between the children</i> ; 1= <i>unequal balance between the children</i>]	0.83, 0.74, 0.97	n.a.	n.a.	n.a.
Affect					
Positive	The extent to which members of the dyad expresses nonverbal and verbal positive affect, including positive facial expressions and laughter. 1–3 rating [1= <i>the child is smiling for most of the segment</i> ; 3= <i>thoroughly positive with extended bouts of giggling or laughter</i>].	0.78, 0.81, 0.87	0.70, 0.62	0.77, 0.78, 0.84	0.62, 0.96
Negative	The extent to which partners express negativity toward one another or toward the task in their facial affect and speech. Includes orders, threats, reprimands, visible tension and nervousness. 1–3 rating [1= <i>the child is complaining or exhibit some frustration toward the friend or the task</i> ; 3= <i>extensive negative affect expressed vocally or physically at any point in the segment</i>].	0.80, 0.76, 0.87	0.84, 0.12	1.00, 0.78, 0.79	0.45, n.a.
Neutral	The extent to which partners manifest neutral affect for most of the segment.	0.95, 0.84, 0.88	0.93, 0.88	0.95, 0.88, 0.94	0.73, 0.86

n.a not applicable

^a The coding produced one score per dyad for this category

T1/T1=Inter-rater reliability at Time 1; T1/T2=Inter-rater reliability between Time 1 and Time 2 coders; T2=Inter-rater reliability at Time 2

Time 2 measures of each friendship questionnaire and friendship observational data. There were no significant a) Sex X ADHD status, b) Sex X Time, or c) Sex X ADHD status X Time interaction effects. We also re-analyzed the

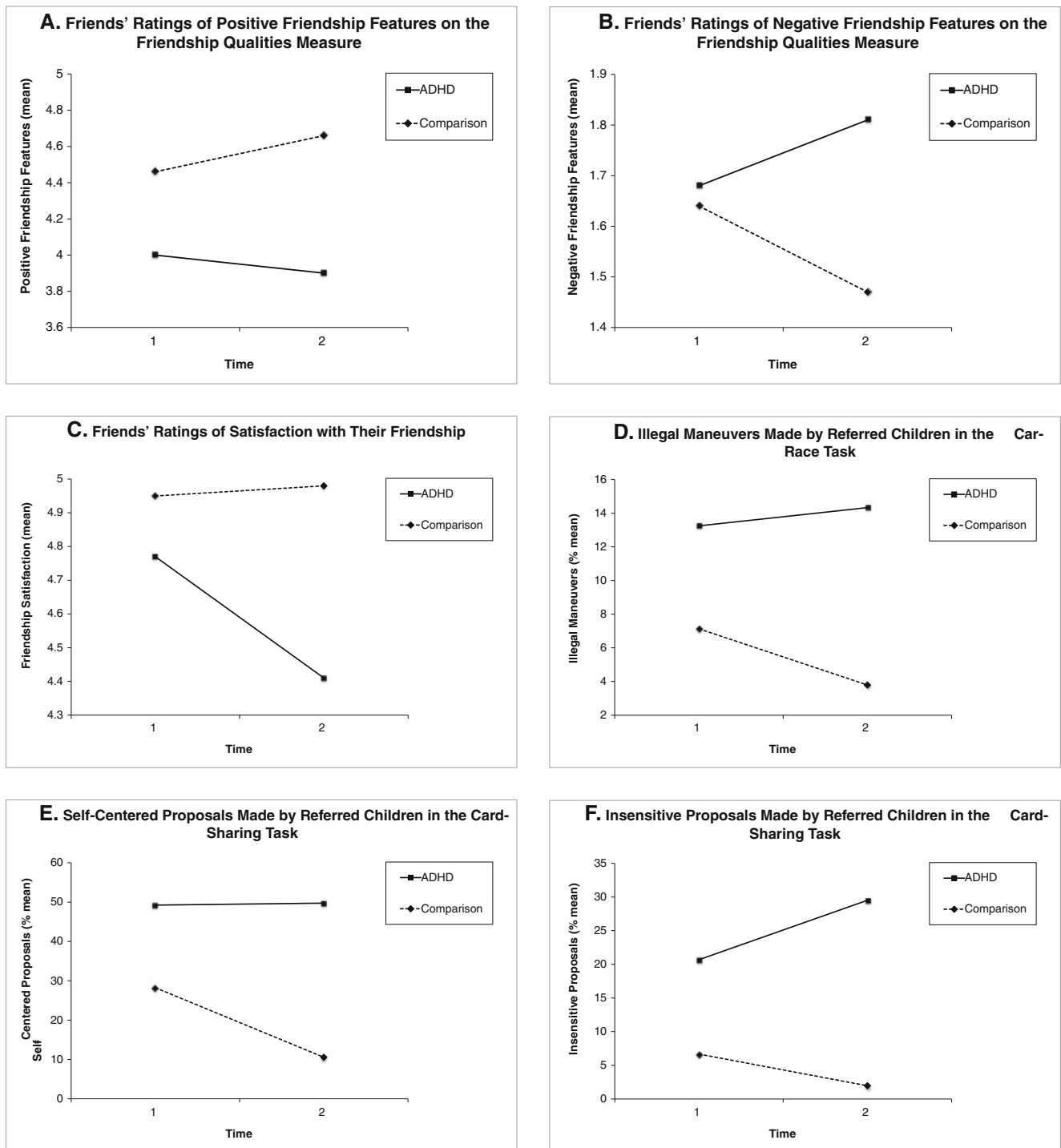


Fig. 1 Significant ADHD status X time interactions

friendship-questionnaire and friendship-observation referred ADHD children's data adding a variable pertaining to age differences, with age dichotomized into two blocks, 7:0 to 10:11 and 11:0 to 13:11 years. There was no significant Age block X Time interaction on any of the dependent measures. Therefore, we decided to enter ADHD status (ADHD, comparison) as the only between-subject factor.

We then performed another wave of data analyses at the dyadic level using the means of the combined data of each dyad. Finally, we re-analyzed the individual friendship-questionnaire and friendship-observation data first without the girls ($n=24$) and then without the cross-gender friendships data ($n=5$). As the overall pattern of results was virtually identical to the one with all the

referred participants, results reported below included all these cases.

Finally, we conducted a series of hierarchical regression analyses to evaluate the relative longitudinal contributions of friendship behaviors and affect in predicting friendship quality and satisfaction after the 6-month follow-up over and beyond Time 1 variance in the criterion variables. We included affect in order to gauge the potential interactive effects of friendship behavior and emotional expression on friendship. We used three different criterion variables in separate regression equations, using the reports provided by the invited friends on the FQM at Time 2: (a) Positive friendship features; (b) negative friendship features; and (c) friendship satisfaction. In order to avoid potential shared method variance, we used the referred children's behavioral data as predictor variables and the reports provided by the invited friends as criterion variables. We entered the predictor variables in the following order: (Step 1) autoregressions (Step 2) friendship behaviors (proportion of illegal maneuvers, self-centered proposals, insensitive proposals, balance of power, preference inquiries, and refusals; all individually entered); (Step 3) negative affect (expressed in the corresponding task); and (Step 4) interactions between friendship behaviors and negative affect. Only differences that remained significant after Bonferroni correction were retained.

Intercorrelations and Descriptive Analyses

Correlations among all variables are presented in supplementary Table 1. Among the 105 intercorrelations among the study variables at Time 1, only 28 (26.6 %) were significant (ranging from 0.17 to 0.50); and, only 4 cross-task correlations were above 0.30. Similarly, among the 105 intercorrelations among the study variables at Time 2, only 23 (21.9 %) were significant (ranging from 0.19 to 0.61); and, only 10 cross-task correlations were above 0.30 (see Suppl. Table 1). We therefore performed the analyses separately for the data pertaining to each task.

Stability of Friendship (Hypothesis a)

There was a significant difference between children with ADHD and comparison children in friendship stability: 91 % ($n=42$) of the 46 comparison children (from baseline) maintained their friendships over the 6-month follow up whereas only 75 % ($n=65$) of the 87 children with ADHD (from baseline) did so, $\chi^2(1,133)=5.27, p=0.02$, Cramer's $V=0.20$. In other words, 25 % of children with ADHD who did have reciprocal friendships with available participants at Time 1 did not at Time 2 (for any reason; see Discussion below) vs. 9 % of comparison children. The remaining analyses reported in this paper were conducted with the

dyads of friends with reciprocal friendships at both time points (ADHD, $n=65$; comparison group, $n=42$).

Children's Reports on Their Friendship Quality (Hypotheses b and c)

A 2 (ADHD status) X 2 (Time) repeated measures ANOVA with the FQM positive and negative dimensions entered separately as the dependent variables indicated that children with ADHD perceived fewer positive features and more negative features than comparison children across time points (see Table 3). There was a significant univariate effect for Time in the referred children's perceptions of positive friendship features (see Table 3). Referred children reported more positive friendship features over time; however there was no significant univariate ADHD status X Time interaction effect in the perceptions of friendship quality of the referred children. There were also significant univariate ADHD-status effects for the invited friends' ratings. The friends of children with ADHD perceived significantly fewer positive friendship features and more negative features in their relationship than did the friends of comparison children across time points. There was no significant univariate effect for Time in the perceptions of friendship quality of the invited friends. There was, however, a significant univariate two-way ADHD status X Time interaction in the invited friends' perceptions of friendship quality (see Table 3). The friends of comparison children reported more positive friendship features and fewer negative friendship features than the friends of children with ADHD over time. In contrast, the friends of children with ADHD reported slightly lower levels of positive friendship features and more negative friendship features over time (see Fig. 1a,b).

A 2 (ADHD status) X 2 (Time) repeated measures ANOVA with friendship satisfaction as the dependent variable indicated that both children with ADHD and their invited friends were significantly less satisfied in their friendships than were comparison children and their respective friends across time points (see Table 3). There was no significant univariate effect for Time and no significant univariate ADHD status X Time interaction in the referred children's satisfaction with their friendship (see Table 3). There was, however, a significant univariate effect for Time and a significant univariate ADHD status X Time interaction effect in the invited friends' satisfaction. Whereas the friends of the comparison group experienced a slight increase in their friendship satisfaction over time, the friends of children with ADHD became considerably less satisfied with their friendship than they were 6 months earlier (see Fig. 1c).

Interactions Between Friends (Hypotheses d, e, and f)

Car-Race Task Repeated-measures ANOVA indicated that children with ADHD exhibited a greater proportion of illegal

Table 3 Descriptive statistics for repeated-measures ANOVAs: Friendship questionnaire data (means with SDs in parentheses)

Category	Time 1		Time 2		Referred Comparison (n=42)	ADHD status F (1, 105)	ADHD status partial η^2	Time F (1, 105)	Time partial η^2	ADHD status X Time F (1, 105)	ADHD status X Time partial η^2
	Referred ADHD (n=65)	Referred Comparison (n=42)	Referred ADHD (n=65)	Referred Comparison (n=42)							
Friendship qualities measure											
Referred children's ratings											
Positive friendship features	3.94 (0.56)	4.23 (0.57)	4.15 (0.64)	4.31 (0.69)	4.90*	0.05	4.51*	0.04	1.01	0.01	
Negative friendship features	1.64 (0.32)	1.53 (0.38)	1.59 (0.52)	1.43 (0.28)	5.30*	0.05	2.31	0.02	0.26	0.00	
Friends' ratings											
Positive friendship features	4.00 (0.61)	4.46 (0.46)	3.90 (0.52)	4.66 (0.43)	45.09***	0.30	1.07	0.01	9.56**	0.08	
Negative friendship features	1.68 (0.34)	1.64 (0.42)	1.81 (0.37)	1.47 (0.33)	9.66**	0.08	0.17	0.00	15.90***	0.13	
Friendship satisfaction											
Referred children's ratings	4.83 (0.37)	4.93 (0.23)	4.82 (0.33)	4.94 (0.16)	5.89*	0.05	0.02	0.00	0.03	0.00	
Friends' ratings	4.77 (0.42)	4.95 (0.19)	4.41 (0.65)	4.98 (0.15)	29.10***	0.22	10.34**	0.09	13.49***	0.12	

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

maneuvers than comparison children across time points. Although there was no significant univariate effect for Time, there was a significant univariate two-way ADHD status X Time interaction in the proportion of illegal maneuvers. In contrast to comparison children who significantly reduced their proportion of illegal moves by more than half between Time 1 and Time 2, children with ADHD slightly increased their proportion of illegal maneuvers (see Table 4 and Fig. 1d). Repeated-measures ANOVA indicated that Children with ADHD expressed a greater proportion of negative affect than comparison children across time points. There was no significant univariate effect for Time or ADHD status X Time interaction effect with regard to the negative affect displayed by the two groups (see Table 4).

Card-Sharing Task As shown in Table 4, children with ADHD made a greater proportion of self-centered and insensitive proposals but a smaller proportion of preference inquiries to their friends than comparison children across time points. There was only one significant univariate effect for Time in terms of proportion of self-centered proposals. There was however a significant univariate ADHD status X Time interaction for the proportion of self-centered and insensitive proposals (see Table 4). Whereas comparison children significantly reduced their use of self-centered and insensitive proposals between Time 1 and Time 2, children with ADHD did not become less self-centered and, in fact, increased their insensitive proposals (see Fig. 1e,f). Finally, there were no significant univariate ADHD status effect, Time effect or ADHD status X Time interaction for refusals and affect. At Time 1, children with ADHD were controlling in 36 out of the 45 dyads (80 %) in which power was unbalanced (see Table 2 for explanation of control in the balance of power variable). In contrast, most friendships were equally balanced in terms of power at Time 2: 62 out of 65 (95 %) children with ADHD were involved in equally balanced friendships in contrast to 100 % of comparison children, $\chi^2(1,107)=1.99, p=0.16$, Cramer's V=0.14.

Game-Choice Task Repeated measures ANOVA revealed a significant ADHD status difference in terms of insensitive proposals and refusals (see Table 4). Children with ADHD made a greater proportion of insensitive proposals and refusals than comparison children across time points. There were no significant univariate group differences in the proportion of preference inquiries or in the affect indices and no significant univariate Time effect or ADHD status X Time interaction for any game-choice task variable (Table 4).

Composition of Dyads (Hypothesis g)

We examined dyadic differences between ADHD/ADHD dyads that comprise two children with ADHD ($n=14, 4$

Table 4 Descriptive statistics for repeated-measures ANOVAs: friendship observation data (means with SDs in parentheses)

Category	Time 1			Time 2			Referred Comparison (n=42)	ADHD status F (1,105)	ADHD status partial η^2	Time F (1, 105)	Time partial η^2	ADHD status X Time F (1, 105)	ADHD status X Time partial η^2
	Referred ADHD (n=65)	Referred Comparison (n=42)	Referred ADHD (n=65)	ADHD status F (1,105)	ADHD status partial η^2	Time F (1, 105)							
Car-race task													
Illegal maneuvers (%)	13.25 (7.24)	7.13 (6.87)	14.33 (6.36)	3.79 (4.10)	56.94***	0.35	3.11	0.03	11.93***	0.10	0.03	11.93***	0.10
Negative affect (%)	1.91 (6.18)	0.01 (0.75)	1.62 (2.04)	0.11 (0.49)	8.47**	0.08	0.13	0.00	0.11	0.00	0.00	0.11	0.00
Card-sharing task													
Self-centered proposals (%)	49.26 (25.61)	28.26 (22.76)	49.75 (17.28)	10.57 (11.56)	74.69***	0.42	10.00**	0.09	5.61*	0.05	0.09	5.61*	0.05
Insensitive proposals (%)	20.68 (22.73)	6.67 (13.99)	29.51 (15.66)	1.96 (0.59)	65.40***	0.38	0.62	0.01	7.93**	0.07	0.01	7.93**	0.07
Preference inquiry (%)	12.29 (25.97)	51.70 (33.98)	14.22 (22.46)	48.40 (21.00)	57.76***	0.36	1.70	0.02	1.86	0.02	0.02	1.86	0.02
Refusal (%)	27.02 (38.49)	27.06 (40.09)	32.38 (38.70)	20.04 (28.42)	1.66	0.02	0.25	0.00	2.03	0.02	0.00	2.03	0.02
Negative affect (%)	0.22 (1.37)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.07	0.01	1.07	0.01	1.07	0.01	0.01	1.07	0.01
Game-choice task													
Insensitive proposals (%)	15.60 (31.32)	3.85 (16.14)	16.51 (17.92)	0.00 (0.00)	14.77***	0.12	1.26	0.01	0.04	0.00	0.01	0.04	0.00
Preference inquiries (%)	15.79 (27.59)	12.58 (28.90)	17.54 (32.65)	12.50 (20.84)	1.16	0.01	0.02	0.00	0.36	0.00	0.00	0.36	0.00
Refusal (%)	16.18 (32.47)	5.36 (21.76)	27.08 (39.82)	7.14 (26.07)	7.61**	0.07	2.63	0.02	1.23	0.01	0.02	1.23	0.01
Negative affect (%)	0.22 (1.34)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.07	0.01	1.07	0.01	1.07	0.01	0.01	1.07	0.01

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

girls) versus “mixed” dyads ($n=51$, 8 girls) in which only the referred child had ADHD. The repeated measures ANOVA results indicated no significant differences between these two types of ADHD dyads in any of the dependent variables.

Longitudinal Predictors of Friendship Quality and Satisfaction (Hypothesis h)

We conducted a series of hierarchical regression analyses to evaluate the relative longitudinal contributions of friendship behaviors and affect in predicting friendship quality and satisfaction at follow-up. Autoregressions were significant predictors in all cases, $p < 0.001$. Preference inquiries made during the card-sharing task at Time 1 were positive predictors of Time 2 positive friendship features, $\beta = 0.16$; $t = 2.12$, $p = 0.04$; $R^2 = 0.02$; $p = 0.04$, whereas insensitive proposals and self-centered proposals were negative predictors of Time 2 positive friendship features (insensitive proposals: $\beta = -0.34$; $t = -4.90$, $p < 0.001$; $R^2 = 0.11$; $p < 0.001$; self-centered proposals: $\beta = -0.26$; $t = -3.57$, $p < 0.001$; $R^2 = 0.06$; $p < 0.001$). Illegal maneuvers during the car-race task at Time 1 also negatively predicted positive friendship features at Time 2, $\beta = -0.22$; $t = -2.91$, $p = 0.004$; $R^2 = 0.04$; $p = 0.004$. Insensitive proposals and preference inquiries made during the card-sharing task and illegal maneuvers made during the car-race task Time 1 were also predictive of Time 2 negative friendship features (insensitive proposals: $\beta = 0.23$; $t = 2.62$, $p = 0.01$; $R^2 = 0.05$; $p = 0.01$; preference inquiries: $\beta = -0.22$; $t = -2.61$, $p = 0.01$; $R^2 = 0.05$; $p = 0.01$; illegal maneuvers: $\beta = 0.18$; $t = 2.01$, $p = 0.047$; $R^2 = 0.03$; $p = 0.047$). There was no significant main effect for other friendship behaviors, negative affect, nor any significant friendship behavior X negative affect interactions. In subsequent analyses, we explored the possibility that some of the predictors applied only to participants with ADHD. However, there were no significant friendship behavior X ADHD status interactions.

Long-Term Implications of Negative Affect Expressed by the Invited Friends

In order to evaluate whether children with ADHD fail to learn over time from the corrective feedback (e.g., negative affect) that their friends provide, we also conducted a series of exploratory hierarchical regression analyses to evaluate the relative longitudinal contributions of negative affect expressed by the invited friends on the friendship behaviors of referred children at follow-up. We used the following Time 2 observational criterion variables in separate regression equations: (a) illegal maneuvers (car-race task), (b) self-centered proposals (card-sharing task), (c) insensitive proposals (card-sharing and game-choice tasks, separately), (d) balance of power (card-sharing task) (e) preference inquiries

(card-sharing and game-choice tasks, separately), and (f) refusals (card-sharing and game-choice tasks, separately). We entered the predictor variables in the following order: (step 1) autoregressions; (step 2) invited friends' negative affect; and (step 3) interactions between invited friends' negative affect and referred children ADHD status. There was no significant main effect for negative affect in any of the nine hierarchical regressions. There was however one significant friends' negative affect X ADHD status interaction for illegal maneuvers ($\beta = -0.23$; $t = -2.33$, $p = 0.02$; $R^2 = 0.03$; $p = 0.02$). The increase in the invited friends' negative affect was associated with an important escalation of illegal maneuvers 6 months later in children with ADHD, whereas it was associated with a small reduction in illegal maneuvers over time in the comparison group.

Discussion

The greater loss of friendship among participants with ADHD (Hypothesis a) is in line with previous studies documenting that children with ADHD have problems maintaining their friendships (Blachman and Hinshaw 2002; Marton et al. 2012). Given the known adverse consequences of being friendless (see Rose and Asher 2000), this is highly worrisome. It is important not to over-interpret these findings because the information about the loss of friendship generally came from unverified parent reports. Nevertheless, our preliminary analyses suggested that several of the same variables that predicted a decline in friendship quality also predicted the non-return of dyads as ongoing friends: insensitive proposals, low initial friendship quality and balance of power. It is also conceivable that dyads who failed to achieve equitable power balance, for example, failed to remain friends. Future investigations should allow sufficient sample for these finer distinctions.

Deterioration in Perceived Friendship Quality Over Time (Hypotheses b and c)

At Time 2, the friends of the participants with ADHD reported less positive friendship quality and more conflict with their friends than at Time 1. They also became considerably less satisfied with their friendship than they were 6 months earlier. In contrast, the friends of comparison children reported fewer negative friendship features, more positive friendship features and a slightly greater friendship satisfaction over time. These opposite trajectories may explain why children with ADHD lose friends with time as friendship stability mainly depends on friendship quality and satisfaction (Ladd et al. 1996). In sharp contrast with the invited friends' reports, and contrary to our expectation, referred children with ADHD did not report deterioration in

their friendship quality over time. Many studies confirm that a subset of children with ADHD overestimate their abilities and performance in various domains, including the social arena (i.e., positive illusory bias; Owens et al. 2007). This biased self-perception may prevent them from accurately assessing their friendship quality, making it difficult for them to adjust their insensitive and disruptive behavior despite receiving negative social feedback from their friends.

Changes in Interactions with Friends Over Time (Hypotheses d, e and f)

Unlike comparison children who significantly reduced their number of illegal moves, children with ADHD slightly increased their illegal maneuvers between Time 1 and Time 2. One possible reason for this is that children with ADHD and their friends develop a tolerance over time for maladaptive dyadic behavior. This may also account for the failure to find significant differences between dyads containing one or two children with ADHD. The inability of children with ADHD to associate behaviors with consequences can inhibit learning in the social contexts where emerging behaviors are rewarded, punished, or extinguished depending on their appropriateness (Sagvolden et al. 2005). Our results could therefore partly be explained by the frequent failure of children with ADHD to learn from their previous friendship experiences. Children with ADHD may fail to learn from the corrective feedback that their friends provide (e.g., negative affect) to manage fast-paced, conflict-provoking situations with as little relationship damage as possible. These findings are worrisome because fairness in play and respect for the rules are among the features that make for enjoyable company that predicts friendship stability (Fonzi et al. 1997).

The increasingly self-centered and insensitive approach of the children with ADHD in their negotiations with friends may reflect a general inability to acknowledge and respond to their friends' social cues, needs, and preferences. Perhaps children with ADHD are unable to recall learned behaviors using relevant previous knowledge to make current decisions. Perhaps they are unable to associate socially appropriate behaviors with their naturally occurring social consequences. Children with ADHD were often more controlling than their friends at Time 1. This was not observed at Time 2, although power imbalance was associated with non-participation at follow-up. Controlling behaviors towards a friend is one reason often provided by children to explain friendship dissolution (Parker and Seal 1996). Partially supporting Hypothesis #6, we found that children with ADHD exhibited more negative emotional reactions than did comparison children in the car-race task at both Time 1 and Time 2. However, these group differences did not

increase over time. This is probably attributable to the friendship context. Interactions with friends are generally positive as friends are expected to provide enjoyable company (Bagwell and Schmidt 2011), resulting in little variance in affect. Hopefully, future observational studies will provide a clearer picture of how children with ADHD regulate their emotions in interactions with their friends during tasks varying in pace and format. It is important to note that our study, specific to the friendship context in which most affect is positive, does not negate the results of many other studies indicating the importance of emotion regulation, which may influence the initial choice of friends (Walden et al. 1999).

Composition of Dyads (Hypothesis g)

Contrary to our hypothesis, the way the friendships of children with ADHD evolved during a six-month follow-up period did not generally differ by the friends' ADHD status. Thus, it appears that friendships with as few as one child with ADHD are significantly impaired and need to be targeted by preventive interventions. It will be important for future studies to follow these mixed vs. ADHD/ADHD friendships over time, focusing on several indicators of psychological adjustment (e.g., school performance, substance abuse, delinquency, conduct problems, anxiety disorders, etc.).

Longitudinal Predictors of Friendship Quality and Satisfaction (Hypothesis h)

As hypothesized, violations of game rules and a self-centered, insensitive negotiation approach predicted deterioration in friendship quality for children with and without ADHD over time. This is consistent with other research showing that dyads exhibiting greater sensitivity in their negotiations are more likely to remain intact than less sensitive dyads (Fonzi et al. 1997). Failure to respect activity rules also predicted the rejection of children with ADHD 2 months later in a study by (Mrug et al. 2007). Our regression analyses, although they do not permit definitive causal inferences, suggest that the violations of game rules and self-centered, insensitive negotiating may be at least a partial cause of friendship deterioration among children with ADHD.

Long-Term Implications of Negative Affect Expressed by the Invited Friends

Our exploratory analyses showed that an increase in the invited friends' negative affect was associated with a substantial increase in illegal maneuvers 6 months later in children with ADHD only, whereas it was associated with

only a small reduction in illegal maneuvers over time in the comparison group. These preliminary results could suggest that children with ADHD fail to learn over time from the corrective feedback that their friends provide over time with their negative affect.

Future Directions

Future studies should include other measures, such as diagnostic interviews, to confirm the diagnostic status of the participants, in greater detail. Given the known intra-individual variability that characterizes ADHD, longer follow-up studies with more than two time points are needed to see what happens to the friendships of children of ADHD over a longer period than 6-months. In addition, future research might include multiple indicators of the existence and continuity of a friendship. Our friendship nominations represent a genuine attempt to confirm the parents' impressions that the two children brought to our study are truly friends. Indeed, in some cases, the nominations did not confirm the existence of the friendship. However, the results might be affected by the demand characteristics of the study, which might mitigate in the direction of nominating the referred child.

We cannot of course generalize to children with ADHD who do not have friends (about 50 %). Our results remain, however, potentially useful in understanding why 40–56 % of children with ADHD do not have friends or lose them over time (Hoza, Mrug et al. 2005; Mrug et al. 2012). Though probably not out of line with the population of children with ADHD in our community (74 % boys and 90 % Caucasian), future studies should also include a more diverse sample of boys and girls. It is possible that we lost some of the most impaired participants (e.g., those from single-parent families) between Time 1 and Time 2, even though there were no significant differences in the friendship, attention-deficit or other demographic data between continuing and non-continuing participants.

Clinical Implications

Existing interventions do not target in direct fashion the maladaptive behaviors that emerged in our study as related to friendship deterioration such as rule violations and poor negotiation skills. One clinical approach might be to include friendship-focused interventions targeting respect of rules, sensitivity to other's wishes, negotiation and compromise in current *general* evidence-based parent training programs (e.g., Incredible Years parents, teachers, and children training series, Webster-Stratton and Reid 2010; Parent-child interaction therapy "PCIT", Zisser and Eyberg 2010). This could for example be achieved in PCIT through direct and active parent coaching of one's child interactions with a

friend during rule-governed play activities, etc. Another option might be to design more *specific* friendship-focused therapy programs such as Parental Friendship Coaching, a group intervention that seems promising according to pilot data. In this approach, parents are taught to give in-vivo reminders to their children and to arrange a context that would be optimal for their children to develop good quality friendships (Mikami et al. 2010). Pair therapy, in which a therapist works with two children, (Selman et al. 1997) may be viable, although it has yet to be established empirically that pair therapy leads to changes in subsequent real-life friendships. Finally, negotiation skills and conformity with rules could be made a specific prescribed aspect of interventions delivered on the schoolyard (e.g., Leff et al. 2004).

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