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Depression, family interaction and family intervention in adolescents at clinical-high risk for psychosis

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Abstract

Aim: The relationship between family behaviour and depression in adolescents at clinical high risk (CHR) for psychosis remains understudied despite high rates of depression in this population. This study examines the relationship between family problem-solving behaviours and depression in CHR adolescents and the impact of family interventions targeting subthreshold symptoms of psychosis on reducing symptoms of depression over 2-years.

Methods: Participants were a subset of the North American Prodrome Longitudinal Study who were randomized to 6-months of family focused therapy for individuals at CHR or family psychoeducational treatment. We evaluated the relationship between communication during family conflict discussion and adolescents' symptoms of depression before treatment. At follow-up assessments the family treatment groups were compared on depression. Finally, we compared those in family treatment with matched controls.

Results: Adolescents' constructive communication was associated with less severe symptoms of depression before treatment. Symptoms of depression improved for adolescents in both family treatment groups. However, there were no significant group by treatment interactions. When adolescents who participated in either type of family intervention were compared to CHR adolescent controls, symptoms of depression improved for adolescents in treatment and control groups, but there were no significant time by treatment interactions.

Conclusions: The communication skills of CHR adolescents are related to both depression and their parents' communication skills pre-treatment. However, reductions in depression over the course of the treatment trial cannot be attributed to family treatment. It is imperative to incorporate interventions that directly target depression into future family treatment studies.

1 | INTRODUCTION

Rising rates of adolescent depression have become a major public health concern in the United States (Mojtabai, Olfson, & Han, 2016). Among adolescents most at risk for developing depression, suicide ideation and attempts are those at clinical high risk (CHR) for psychosis (Andriopoulous, Ellul, Skokou, & Beratis, 2011; Barrett et al., 2010; Brown, 1997). Estimates of depression in samples at CHR range as high as 55% (Fusar-Poli et al., 2013; Lim et al., 2015; Salokangas et al., 2012; Woods et al., 2009) and are one of the most distressing concerns that prompt CHR individuals to seek treatment (Rapado-Castro, McGorry, Yung, Calvo, & Nelson, 2015). Further, the diagnosis of depression in CHR adolescents has been associated with functional impairment (Fulford et al., 2014; Lim et al., 2015), more severe symptoms of psychosis, and a decreased likelihood of remission from CHR status (Kline et al., 2018).

The family environment is consequential for adolescents with depression and CHR syndromes. Family environments marked by low support, high conflict and high criticism have been associated with greater symptoms of depression in both clinical and community samples of adolescents (McCleary & Sanford, 2002; Sheeber, Allen, Davis, & Sorensen, 2000), and adolescents at CHR experience higher levels of family conflict and impairment in relationships with parents than do adolescents with different symptoms of psychopathology (Bentley et al., 2016; Salinger, O'Brien, Miklowitz, Marvin, & Cannon, 2018; Thompson et al., 2015). In contrast, family environments higher in warmth, emotional involvement and positive remarks have been associated with improvement in subthreshold symptoms of psychosis in adolescents at CHR (O'Brien et al., 2006; Schlosser et al., 2010). Additionally, family-based interventions have demonstrated efficacy in decreasing positive subthreshold symptoms of psychosis (Miklowitz et al., 2015) and improving family communication (O'Brien et al., 2014). However, the relationship between family intervention and adolescent depression has yet to be evaluated.

The current study first examines the relationship between family communication within laboratory-based problem-solving discussions and depression in adolescents at CHR for psychosis. Second, the impact of family interventions designed to target the reduction of subthreshold symptoms of psychosis on adolescents' symptoms of depression are examined. Families were recruited for a randomized trial of family therapy. An observational method (O'Brien et al., 2014) was used to measure family problem-solving to avoid the possible negative self-report bias of reports of the family environment provided by depressed individuals (Duque & Vasquez, 2015; Lazarov, Ben-Zion, Shamai, Pine, & Bar-Haim,

2018). We hypothesize that: (a) constructive communication behaviours exhibited by mothers, fathers and adolescents during family problem-solving discussions would be negatively associated with adolescents' symptoms of depression at baseline; (b) a more intensive, 18-session family intervention that included family training in communication and problem solving would be associated with greater decreases in adolescents' symptoms of depression at follow up than would a less intensive, three session family intervention; and (c) decreases in symptoms of depression would be significantly greater for adolescents participating in a randomized control trial of family therapy than for those who were not participating in the trial of family therapy, but were free to pursue services in the community.

2 | METHOD

2.1 | Participants

The participants in this study were a subset of those recruited to the North American Prodrome Longitudinal Study (NAPLS) consortium of eight research centres. The study was approved by the human research boards and conducted in compliance with the Internal Review Boards for each of the centres. Individuals considered for inclusion to NAPLS were between 12 and 35 years old, primarily English speaking, and met criteria for one of three prodrome syndromes (attenuated positive symptoms, brief intermittent psychosis and/or genetic risk or deterioration) assessed by the Structured Interview for Prodromal Symptoms (Miller et al., 2003). Exclusion criteria included a previous DSM-IV (American Psychiatric Association, 1994) diagnosis of schizophrenia or schizoaffective disorder, intellectual disability, current drug or alcohol dependence, or the presence of a neurological disorder.

In all analyses, we included NAPLS adolescents (<19 years) who participated in a randomized clinical trial of family therapy. Families were randomly assigned (Efron, 1971) to family focused therapy for individuals at clinical high risk (FFT-CHR), an 18-session family treatment that included psychoeducation about early signs of psychosis, stress management, communication training and problem-solving training, or enhanced care (EC) treatment consisting of three family sessions of psychoeducation. The first analysis included adolescents who completed a measure of depression (n = 69), and the family problem-solving discussion with their mothers (n = 64) and/or fathers (n = 41) prior to the second treatment session. We included adolescents who participated in at least three sessions of treatment (FFT or EC) and completed baseline and 6-month follow-up measures of depression (FFT n = 32, EC n = 26) in our second analysis and a reduced sample who also completed 18- and 24-month assessments (FFT n = 22, EC n = 13) in the third analysis. Finally, in our fourth analysis, we included a sample of adolescents matched on age and gender who participated in NAPLS (n = 58) and completed baseline and 6-month follow-up measures of depression but did not participate in the randomized control trial of family therapy, and a reduced sample who also completed 18- and 24-month assessments (FFT/EC = 33 and NAPLS = 33) were included in the fifth analysis. We selected the NAPLS control group of adolescents based on order of entry into the database. For demographic information, see Table 1. For more information on NAPLS and the randomized control trial, see Miklowitz et al., 2015 or O'Brien et al., 2014.

2.2 | Procedure

2.2.1 | Problem-solving interaction—First, adolescents selected a topic that created conflict within their family. Once there was consensus on the topic selected, research personnel asked the family to discuss the topic and reach a resolution within 10-minutes. The interactions were videotaped and later transcribed and independently coded by at least two coders. For a full list of codes, see Table 2. Acceptable levels of inter-rater agreement (Shrout & Fleiss, 1979) were achieved (.79–.89) based on a randomly selected 33% of the coded data.

2.2.2 | Constructive problem solving—Mother, father and adolescent behaviour were coded individually during the problem-solving interaction. We calculated a positive behaviour variable by summing the positive verbal and nonverbal behaviour codes and then dividing the number of positive codes by the total number of speaking turns for that individual. We also calculated a negative behaviour variable in the same manner, using negative verbal and nonverbal behaviour codes. The resulting ratios represented the proportion of speaking opportunities during which each individual was demonstrating positive or negative behaviour out of the total number of times they spoke during the interaction. We then created one scale of constructive problem solving for each family member by subtracting the ratio of negative behaviours from the ratio of positive behaviours for each individual. (For further information regarding these procedures see O'Brien et al., 2014).

2.2.3 | Symptoms of depression—The Calgary Depression Scale for Schizophrenia (D. Addington, Addington, & Maticka-tyndale, 1993) was used to measure symptoms of depression independently from negative symptoms of schizophrenia. Adolescents were asked to complete the scale at baseline, 6 months (after the completion of the family therapy), 12, 18 and 24 months. The measure has demonstrated internal consistency, inter-rater reliability, sensitivity, specificity and discriminant and convergent validity (J. Addington, Shah, & Addington, 2014).

2.2.4 | Analysis—Pearson correlations were conducted to evaluate the relationship between mothers', fathers' and adolescents' constructive problem-solving behaviours and adolescents' symptoms of depression pre-treatment. A repeated measures ANOVA was conducted to compare treatment groups (EC vs FFT-CHR) on adolescents' depression at pre- and post-treatment (6 months). A separate repeated measures analysis compared adolescents who participated in the trial to adolescents who participated in NAPLS but received community treatment, on adolescents' depression at baseline, 6, 12, 18 and 24 months.

3 | RESULTS

3.1 | Constructive communication and adolescent depression at baseline

Our first hypothesis, that constructive communication of adolescents, mothers and fathers during family problem solving interactions would be associated negatively with adolescent depression at baseline, was partially supported. Adolescents' constructive communication

was significantly associated with their symptoms of depression ($r[69] = -.27$, $P = .03$), but mothers' ($r[64] = -.18$, $P = .16$) and fathers' ($r[41] = -.03$, $P = .87$) constructive communication were not. Interestingly, there were significant correlations between adolescents' constructive communication and mothers' ($r[64] = .68$, $P < .001$), as well as fathers' ($r[41] = .49$, $P = .001$) constructive communication (Table 3).

3.2 | Depression by treatment group (FFT vs EC)

There was a significant main effect of time ($F_{1,56} = 7.67$, $P = .008$), indicating that depression scores were significantly higher at pre-treatment (M = 6.10, SD = 5.13) than at post-treatment (M = 4.21, SD = 5.20). However, there was not a significant interaction of time by treatment group ($F_{1,56} < 1$, $P = .56$) on changes in depression.

When examining the five assessment points (baseline, 6, 12, 18 and 24 months), we observed a significant main effect of time ($F_{4,30} = 3.70$, $P = .01$) indicating that depression scores were significantly higher at pre-treatment (M = 5.94, SD = 5.33) than at 6 months (M = 4.11, SD = 5.22), 12 months (M = 3.83, SD = 4.72), 18 months (M = 2.86, SD = 3.57) and 24 months (M = 3.23, SD = 4.23) follow up. There was no significant interaction of treatment group and time ($F_{4,30} < 1$, $P = .66$) on changes in depression. Thus, the decrease in symptoms of depression cannot be attributed to engagement in the more intensive family therapy that included training in communication and problem-solving skills.

3.3 | Depression by treatment group (family treatment vs NAPLS participants)

Adolescents from the NAPLS study who did not participate in the family treatment trial served as a control group for participants who received FFT or EC. A repeated measures ANOVA was used to examine the main effect of time (baseline and 6 months), treatment (FFT and EC, n = 58, vs NAPLS, n = 58) and the treatment by time interaction on symptoms of depression in CHR adolescents. A repeated measures ANOVA indicated a significant main effect of time ($F_{1,114} = 12.29$, $P = .001$), indicating that depression scores were significantly higher at pre-treatment (M = 5.85, SD = 5.49) than at 6 months (M = 4.06, SD = 4.86). There was no significant interaction of treatment by time ($F_{1,114} < 1$, $P = .84$) on changes in depression.

A second repeated measures ANOVA showed a significant main effect of time at five assessments (baseline, 6, 12, 18 and 24 months). There was no significant interaction of time by group (FFT and EC, n = 35, vs NAPLS, n = 35; $F_{4,65} = 8.01$, $P < .000$; $F_{4,65} = 2.16$, $P = .08$) on symptoms of depression. Those who participated in the family treatments did not show more improvement in depression than the NAPLS control group at 18 months and 24 months.

4 | DISCUSSION

Individuals at CHR for psychosis often have significant levels of depression before developing the full psychosis syndrome. Depression is also one of the most distressing concerns among adolescents at CHR and can present heightened risk for suicide (Andriopoulous et al., 2011). This study examined the relationship between family communication and adolescent symptoms of depression among individuals who met criteria

for a psychosis risk syndrome. Prior to treatment, adolescents' constructive communication behaviours during family problem solving interactions were positively correlated with fewer symptoms of depression. These findings do not reflect common method variance since we assessed communication behaviours with observational data. While mothers' and fathers' constructive communication behaviours were significantly correlated with their adolescents' constructive behaviours, they were not correlated with adolescents' depression.

One interpretation of these data is that adolescents' depression is manifested in more irritable and less constructive behaviour during family problem-solving interactions, which through contagion and reciprocal processes creates less constructive exchanges in these families (Coyne, 1976; Joiner & Katz, 1999). These findings are consistent with previous research that has found a longer duration and broader range of negative affect in family interactions with a depressed adolescent (Hollenstein, Allen, & Sheeber, 2016; Sheeber et al., 2000). Depression may contribute to a suboptimal family environment by increasing negative interpersonal interactions as well as levels of stress on the family (Garber, 2005) which may be intensified by parents' negative reactions to symptoms of depression.

We then investigated whether participants in family focused therapy for individuals at CHR, who in prior studies showed greater improvements at 6-month assessment in constructive communication (O'Brien et al., 2014) and in attenuated positive symptoms of psychosis (Miklowitz et al., 2015) compared to individuals who participated in three sessions of psychoeducation, demonstrated greater reductions in symptoms of depression. There were significant reductions in symptoms of depression from pre-treatment to post-treatment for all adolescents who participated in family treatment, FFT or EC, and those reductions were sustained over 24 months. However, because we did not detect a significant difference between the treatment groups, the symptom improvement could not be attributed to the family interventions. The results from the current study indicate that improvement in family constructive communication within this sample (O'Brien et al., 2014) did not promote differential improvement in adolescents' symptoms of depression. The possibility that participation in a specialty clinic with caring and knowledgeable professionals, the passage of time, spontaneous remission, or some other factor is causing the change in depression cannot be ruled out.

To evaluate the possibility that both the higher and lower intensity family treatments contributed to the reduction in symptoms of depression, we selected a control group consisting of adolescents who participated in NAPLS but not in the family treatment trial. All adolescents enrolled in NAPLS participate in diagnostic interviews and receive treatment recommendations and referrals for community care as appropriate. Therefore, the NAPLS subsample is best conceptualized as age-matched CHR adolescents who received community care supplemented by monitoring and support from the NAPLS team. At the 6-month assessment point, symptoms of depression had improved significantly for both family treatment and control groups, and there was no clear advantage for those who participated in the family treatment trial. The same result was found with the analysis of changes in depression across five data points, starting at baseline and ending at 24 months. In this study, family intervention was not more effective in reducing symptoms of depression than was

ongoing monitoring, assessment and support by the NAPLS team and referrals to community care.

In this study attrition limits statistical power to test differences longitudinally. Further research is necessary to elucidate the mechanisms of change in symptoms of depression among adolescents at CHR for psychosis. Given the high rates of depression among adolescents at CHR and the associated risks (eg, suicide), it is imperative to incorporate interventions that directly target depression (eg, behavioural activation) into future family treatment studies. The role of family interventions in modifying attributes of the family environment that may mediate improvement in depression deserves further investigation, particularly in CHR samples enriched for the presence of depressive disorders.

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TABLE 1

Sample characteristics

	Baseline (n = 69) *M* (*SD*)	FFT and EC (n = 58) *M* (*SD*)	NAPLS (n = 58) *M* (*SD*)
Adolescent age (years)	15.5 (1.77)	15.43 (1.68)	15.69 (1.71)
Mother age (years)	44.0 (6.05)	43.54 (5.47)	46.26 (6.91)
Father age (years)	48.2 (5.88)	46.96 (6.40)	48.26 (6.41)
	% (n)	% (n)	% (n)
Adolescent gender			
Male	60.9 (42)	56.9% (33)	58.6% (34)
Female	39.1 (27)	43.1% (25)	41.4% (24)
Adolescent race/ethnicity			
Caucasian	46.4 (32)	56.9% (33)	51.7% (30)
Hispanic	15.9 (11)	6.9% (4)	5.2% (3)
African American	10.1 (7)	15.5% (9)	15.5% (9)
Asian	4.35 (3)	5.2% (3)	6.8% (4)
Multiracial	4.35 (3)	8.6% (5)	17.2% (10)
Native American	2.90 (2)	5.2% (3)	1.7% (1)
Middle Eastern	1.45 (1)	1.7% (1)	1.7% (1)
Did not report	14.5 (10)		
Mother Educational Attainment			
Primary School	1.6% (1)	1.8% (1)	5.3% (3)
High School	29.7% (19)	28.1% (16)	19.3% (11)
Undergraduate or Technical School	50% (32)	49.1% (28)	49.1% (28)
Graduate or Professional School	18.7% (12)	21.1% (12)	26.3% (15)
Father Educational Attainment			
Primary School	0	5.4% (3)	5.4% (3)
High School	22% (9)	32.1% (18)	30.4% (17)
Undergraduate or Technical School	53.7% (22)	41.1% (23)	39.3% (22)
Graduate or Professional School	22% (9)	21.4% (12)	25% (14)

Note: The baseline group (n = 69) included adolescents, mothers, and fathers in either FFT or EC that completed the 10-minute conflict discussion and pre-treatment measure of depression, used in our first analysis. The FFT and EC group (n = 58) included adolescents who had completed at least three sessions of family therapy and completed at least the pre-treatment and post-treatment measures of depression and were compared directly to the NAPLS only group. The NAPLS group (n = 58) included age-matched adolescents who did not enrol in family therapy but were enrolled in the longitudinal

study and completed baseline and follow-up measures of depression, serving as a comparison group to the adolescents receiving family therapy. The FFT and EC group and NAPLS group were used in our third analysis.

TABLE 2

Codes for verbal and non-verbal behaviours

Positive codes

    Displays of affection/genuine humour/supportive remarks

    Compliments

    Mild listening

    Active listening

    Positive speaking/communication clarity

    Positive request for change

    Expressing negative feelings about specific behaviour

    Organization/keeping conversation on track

Negative codes

    Irritability defensiveness/withdrawal

    Displays of anger

    Complaints

    Critical/threatening comments

    Cut-offs

    Monologue

    Speaking for the other/guilt inducing statements

    Off-task behaviour

Note: Coders rated each speaker turn and tallied the frequency with which each code had been assigned to each family member during the interaction. If an individual received a negative code during any speaking turn besides cut-offs, a positive code could not be given for the same speaking turn. After independently rating the interactions, coders met to resolve discrepancies and create consensus data which was used in all further analyses.

TABLE 3

Mean scores on family problem solving discussion and the Calgary Depression Scale for Schizophrenia

| | Pre-treatment FFT or EC *M* (*SD*) | FFT and EC vs NAPLS only | | |
		FFC and EC *M* (*SD*)	NAPLS *M* (*SD*)	Overall *M* (*SD*)
Family problem solving behaviour				
Adolescent constructive problem solving	0.22 (0.72)	-	-	-
Mother constructive problem solving	0.60 (0.76)	-	-	-
Father constructive problem solving	0.67 (0.75)	-	-	-
Calgary Depression Scale				
Baseline	5.74 (4.75)	5.94 (5.33)	6.94 (5.46)	6.44 (5.38)
6-months	-	4.11 (5.22)	3.97 (3.78)	4.04 (4.53)
12-months	-	3.83 (4.72)	2.80 (2.67)	3.31 (3.84)
18-months	-	2.86 (3.57)	3.91 (4.12)	3.39 (3.86)
24-months	-	3.23 (4.23)	4.40 (3.87)	3.81 (4.07)

Note:

*
$P < .05.$