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The Depression Impairment Scale for Parents (DISP): A new scale for the measurement of impairment in depressed parents

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ABSTRACT

Children of depressed parents are at increased risk of developing mood disorders but mechanisms of intrafamilial transmission are currently unclear. One rarely investigated area is the impact of depression on a parent's everyday functioning. Currently there are no validated assessments of depression-specific parental impairment. The creation of such a measure would complement depression symptom counts, providing a more comprehensive account of the parent's depression. We therefore aimed to develop a valid and reliable measure of impairment specifically associated with parental depression. In a longitudinal study of parents with recurrent unipolar depression and their offspring, we collected data from 337 parents. These participants completed the Depression Impairment Scale for Parents (DISP), a questionnaire assessing depression-associated impairment in multiple domains of functioning. Factor analysis revealed that this measure consisted of two factors – impairment in routine tasks/activities and impairment in family functioning – that together accounted for 51.04% of variance. The scale evidenced good internal consistency (Cronbach's alpha=0.82). The DISP also displayed good construct and criterion validity as evidenced by significant associations with established measures of depression severity and global impairment. These results demonstrate that the DISP is a valid and reliable measure of depression-associated impairment in parents.

1. Introduction

Offspring of depressed parents face an increased risk of developing depressive disorders (Beardslee et al., 2011), with children of depressed parents being three to four times more likely to develop depression than children of healthy parents (Rice et al., 2002). Within this group it is important to identify which features of parent depression confer risk to children in order to target individuals for early intervention and/or treatment. However, risk factors can be difficult to delineate because depression is a highly heterogeneous disorder, with research finding that a variety of parental depression features – such as age of onset, severity, course, and symptom profile – can all contribute to increased risk in offspring (Brennan et al., 2000; Halligan et al., 2007; Hammen and Brennan, 2003; Mars et al., 2012; Weissman et al., 1984). Thus, in order to determine which aspects of parental depression confer intrafamilial transmission, there is a need for the development of measures to delineate the heterogeneous nature of depression.

An additional way to capture heterogeneity in parental depression might be to measure the level of impairment in daily functioning experienced by depressed parents. Using measures of impairment to complement depression scores is an essential part of clinical practice as clinicians consider both symptom levels and whether those symptoms are associated with impairment in the person's daily functioning (American Psychiatric Association, 1994). Accordingly, treatment aims to improve both symptoms and impairment (Möller et al., 2003), which are assessed at follow-up in order to document patient progress.

Despite the emphasis on impairment in clinical settings, there is a paucity of validated measures assessing impairment specific to depression. This is primarily because researchers rarely measure impairment directly, with a recent review finding that less than 5% of clinical trials measure and report functional outcomes

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(McKnight and Kashdan, 2009). Thus, research typically infers impairment using depression symptom counts. This relies on the assumption that depression symptoms are a proxy for impairment. In fact, research that has investigated impairment in patients with major depressive disorder finds that impairment and number of depression symptoms are not always concordant; previously depressed patients can demonstrate significant impairment, even though they may not currently meet diagnostic criteria for a depressive episode (Kennedy et al., 2007; Zimmerman et al., 2008, 2006). Therefore, to provide a more accurate account of depression severity, researchers should consider the impairment that accompanies depression symptoms. Other researchers, such as Kupfer et al. (2008), have noted this, arguing that the use of symptoms alone is insufficient to accurately represent the complexity of psychiatric disorders.

Current impairment measures are of limited use for investigating mechanisms of intrafamilial transmission of depression. First, some impairment measures do not require the participant to reflect on how their depressive symptoms specifically affect functioning (e.g. Short Form Health Survey, Ware and Sherbourne, 1992; EuroQol Group, 1990). For example, the EuroQol includes statements about self-care (i.e. "I have some problems washing and dressing myself") of which the participant chooses the most appropriate. However, if participants respond that they are greatly impaired, it is not deducible whether this impairment is due to depression or another illness. Thus, greater sensitivity might be gained by requiring participants to reflect on the impact of depression on their functioning. Second, measures requiring participants to reflect on depression-specific impairment generally are restricted to a specific domain of functioning, such as social, occupational, or physical impairment (see McKnight and Kashdan, 2009, for a review). Additionally, measures which require the participant to reflect on multiple domains of depression-specific impairment (e.g. Zimmerman et al., 2004) do not examine parental impairment in depth, and are thus insufficient to investigate intrafamilial transmission of depression. When examining this, it may be prudent to measure the parent's impairment in areas that are more salient to offspring, such as family processes. A large corpus of research has implicated factors such as parent-offspring conflict (Rueter et al., 1999), adverse family environments (Eley et al., 2004; Sander and McCarty, 2005), parenting behaviour (Alloy et al., 2006), and marital difficulties (Cummings et al., 2005; Downey and Coyne, 1990) in the onset and maintenance of offspring depressive symptoms. Whilst time constraints of research and clinical protocols preclude the use of separate questionnaires to assess each domain of familial functioning, incorporating elements of this research into an impairment questionnaire for parents may be pertinent when assessing intergenerational transmission of depression.

In summary, previous findings emphasise the need in clinical and research settings for validated measures of depression-specific impairment. Ideally, these would be used to complement measures of depressive symptoms and provide a more comprehensive account of the parent's depression. This ultimately would benefit the parent because it would allow more accurate monitoring of progress, more effective treatment and, ergo, a more favourable prognosis. Additional benefits are also conferred to the offspring of these parents through the potential to identify features of parental depression that heighten intrafamilial risk.

To our knowledge there are currently no validated measures assessing impairment in depressed parents. Therefore, our aim in this paper was to report on the development, validity, and reliability of a new measure that assesses depression-specific impairment in parents. As an additional test of validity, we also aimed to examine the association between impairment scores on this measure and child depression outcomes.

As we intended this measure to be applicable to clinical populations rather than community samples our results derive from a dataset of recurrently depressed parents. To capture impairment that may increase offspring risk for depression, we designed the measure to assess impairment in family-specific domains as well as impairment in other everyday tasks. However, to ensure brevity we aimed for the questionnaire to contain approximately 10 questions.

2. Methods

2.1. Scale construction

We aimed to construct and validate the *Depression Impairment Scale for Parents (DISP)* for use by clinicians and researchers to assess impairment in individuals with unipolar depression. Based on clinical experience and a review of the literature, two psychiatrists and a developmental psychologist selected items to include in the measure. This consisted of 11 statements designed to assess domains of life that may be affected when the parent experienced symptoms of depression. These domains included impairment in relationships with family and friends, daily tasks in and outside the home, personal care, and work (see Appendix A). Each statement (except question 8, see Appendix A) consisted of a 3-point Likert scale that assessed the degree of impairment experienced (0 "no", 1 "yes, a bit", and 2 "yes, a lot").

2.2. Participants

Our analyses utilize data from participants in the 'Early Prediction of Adolescent Depression' study (Mars et al., 2012), a prospective longitudinal study of depressed parents and their offspring. The sample at baseline consisted of 337 parents (315 mothers and 22 fathers aged 26–55 years, mean age 41.7 years) with a history of recurrent unipolar depression (two or more episodes in lifetime). We obtained our sample principally from general practices in the South Wales area (78%). Former publications that have utilised this sample contain further information regarding study recruitment, inclusion and sampling procedure (Lewis et al., 2012; Mars et al., 2012). History of depressive episodes was assessed at study entry using a life history calendar approach (Caspi et al., 1996). Following the baseline assessment, participants were assessed at a further two time points, with an average interval of 16.2 months (SD=2.69) between the first and second assessment and 12.5 months (SD=1.56) between the second and third assessment. We excluded two parents at the second and third assessment due to a diagnosis of bipolar disorder. Data for the DISP were available for all participating parents at the first assessment (n=334). At baseline, parents reported on current depression associated impairment if they had current depressive symptoms. If parents were free of depressive symptoms at the baseline assessment, they reported on depression associated impairment for their worst ever episode (see Table 1). At subsequent assessments, parents completed the measure if they had current depressive symptoms or on depression-associated impairment for the worst episode they had experienced in between assessments (see Table 1).

2.3. Data collection

The Multi-centre Research Ethics Committee for Wales approved the study protocol. Prior to participation participants provided written informed consent/assent. Researchers visited participants in their homes to administer interviews and questionnaires. At each assessment, these included:

Table 1
Number of parents who completed the Depression Impairment Scale for Parents (DISP) at each assessment. Parents reflected on impairment associated with depression symptoms experienced in the preceding month or during past episodes of depression.

	***n* (%)**	
	Current symptoms	**Past episode***
Baseline	170 (50.9)	164 (49.1)
Second assessment	129 (66.5)	65 (33.5)
Third assessment	138 (75.0)	46 (25.0)

* At baseline, past episode refers to the worst ever episode of depression experienced by the participant whereas at subsequent assessments this refers to the worst episode experienced between assessments.

a. The Schedules for Clinical Assessment in Neuropsychiatry (SCAN, Wing et al., 1990), a semi-structured interview which assessed the presence of a depressive episode in the month preceding the interview and was also used to generate total DSM-IV depression symptom scores (range 0–9) (American Psychiatric Association, 1994).
b. An interview documenting whether the participant had experienced any episodes of depression prior to the visit. At baseline this referred to any episodes experienced in the participant's lifetime and, at the second and third assessment, the number of episodes experienced between interviews. Researchers performed this interview using a life history calendar approach (Caspi et al., 1996). For each documented episode, researchers ascertained details concerning treatment, hospitalisation, and number and type of symptoms that were present.
c. The parent and child versions of the Child and Adolescent Psychiatric Assessment (CAPA, Angold and Costello, 2000), a semi-structured interview. This was used to measure child depression symptoms in the three months preceding the interview. Information from this assessment was additionally used to determine whether the participant's child developed a mood disorder at subsequent assessments (i.e. a new onset mood disorder) according to DSM-IV criteria (see Lewis et al., 2012, for more information regarding derivation of the new onset mood disorder variable).
d. The Depression Impairment Scale for Parents (DISP) to be validated. Researchers administered this after the participant had completed the SCAN and timeline interviews.

At the first assessment all participants completed the DISP. However, if at the second and third assessment participants did not present with any symptoms of depression during the SCAN interview and had not experienced any episodes between assessments, researchers did not administer the DISP. This resulted in a sample size of 334, 194 and 184 at the first, second and third assessment, respectively. Before completing the DISP, researchers asked participants to reflect on how their depression had affected them. If no symptoms of depression had been experienced in the month prior to interview participants were asked about the level of impairment they had experienced in their worst ever episode of depression (this would either refer to the worst episode experienced between visits or the worst episode experienced prior to the first visit).

In addition, two weeks before the interview date participants completed a variety of questionnaires. These questionnaires assessed current depression symptoms using the Beck Depression Inventory (BDI, Beck et al., 1979), the Hospital Anxiety and Depression Scale (HADS, Zigmond and Snaith, 1983), and the Patient Health Questionnaire (PHQ9, Kroenke et al., 2001). One questionnaire assessed overall health and functioning using the EuroQol (EuroQol Group, 1990). Another set of questionnaires assessed the participant's relationships with their family, spouse and child, which included the Marital Adjustment Test (MAT, Locke and Wallace, 1959); Family Environment Scale (FES, Moos and Moos, 1976); and the Parental Affiliative Style Questionnaire (PASQ, Davies et al., 2002; Rohner, 1984). Finally, the participants' children completed a set of questionnaires which included the Children's Report of Parent Behaviour Inventory (CRPBI, Margolies and Weintraub, 1977) as a measure of parent–child interaction.

2.4. Data analysis

We analysed data using SPSS version 20. Total impairment scores were normally distributed. Where additional variables deviated from normality, they were corrected using natural log or square root transformations.

2.4.1. Item analysis

Prior to analyses, we noted that some participants' responses had been coded as "not applicable", even though this is not an available response on the questionnaire. Further inspection revealed these to be questions where the respondent deemed the item not relevant (e.g. question 2 asks, "Does it affect how you get on with your partner?" which is not relevant to individuals who are single). We recoded items as missing if the participant had responded "not applicable". Upon further investigation we decided to remove question 8 and question 8a due to the fact that almost half of participants were homemakers or unemployed (42.1%), thus creating a large proportion of missing data, and also because the question response format was inconsistent with other items in the questionnaire (see Appendix A). Following this, we performed principal axis factoring with oblimin rotation (as we expected factors to correlate) and Kaiser normalization. To determine the principal factors we observed the eigenvalues and the proportion of variance explained. The resulting factors were analysed for reliability and validity.

2.4.2. Reliability

We assessed internal consistency using Cronbach's alpha coefficient (Cronbach, 1951). We calculated stability of scores with Pearson's correlation coefficient using data collected at the second and third assessments.

2.4.3. Validity

We assessed validity by correlating scores on the DISP with scores from other self-report measures (interviews or questionnaires).

2.4.3.1. Construct validity. For convergent validity and divergent validity, we correlated the resultant factors of the DISP with measures of depression symptoms (SCAN, PHQ9, HADS depression subscale, BDI), family interaction (MAT, FES, CRPBI, PASQ), and other measures of impaired functioning (EuroQol). If questionnaire measures required participants to answer about a recent period of time (e.g. how they had been feeling in the two weeks prior to completing the questionnaire), we restricted the sample to include only those participants who had reported on impairment from depression in the previous month. This was necessary to ensure maximum concordance between responses on the questionnaires administered two weeks prior to interview and responses on the impairment questionnaire completed at interview. If questionnaire measures referred to a longer period than the month preceding interview we calculated correlations for all participants.

2.4.3.2. Criterion validity. We assessed criterion validity by determining whether baseline DISP scores significantly predicted the parents' depression scores at the second and third assessment. In addition, we examined whether baseline DISP scores were significantly associated with child depression symptoms and child new onset mood disorder at the second and third assessment.

3. Results

There were no significant correlations between parental age and impairment scores. Further demographic information is reported in Table 2. Analysis on missing data for total impairment scores using Little's MCAR test revealed no reliable deviation from randomness ($\chi^2=6.354$, $df=9$, $P=.704$), therefore listwise analyses were conducted.

3.1. Item analysis

Exploratory factor analyses on baseline data revealed two factors which were selected based on factor loadings greater than 0.3 (see Table 3). One factor represented impairment in routine tasks and activities (Factor 1, questions 4 to 11), whilst another represented impairment in interacting with family members (Factor 2, question 1 to question 3). After rotation, factor loadings for Factor 1 ranged from 0.41 to 0.84, and factor loadings for Factor 2 ranged from 0.52 to 0.61. Factor 1 had an eigenvalue of 3.91 and explained 39.05% of the variance among the items. Factor 2 had an eigenvalue of 1.20 and explained 11.98% of variance. Thus, both factors accounted for over 50% of variance. The pattern of results remained the same when performing factor analyses on data from the second and third assessment.

Table 2
Characteristics of participants in the Early Prediction of Adolescent Depression study.

	Baseline	Second assessment	Third assessment
N (% female)	334 (93.4)	194 (92.3)	184 (92.9)
Mean (SD) parental age, years	41.59 (5.47)	42.81 (5.59)	44.25 (5.81)
Mean (SD) depression symptoms at baseline, SCAN	2.64 (2.68)	2.94 (2.75)	2.42 (2.66)
Mean (SD) impairment score, DISP	8.31 (4.83)	7.17 (4.69)	6.53 (4.55)

SCAN, Schedules for Clinical Assessment in Neuropsychiatry; DISP, Depression Impairment Scale for Parents.

Table 3
Results of the factor analysis for items of the DISP, oblimin-rotation factor loadings.

DISP items	Factor 1 (impairment in routine tasks/activities)	Factor 2 (impairment in family functioning)
1. Does it affect how you get on with your child?	0.02	**0.61**
2. Does it affect how you get on with your partner?	−0.01	**0.52**
3. Does it affect how you get on with people in your extended family?	0.04	**0.53**
4. Does it affect the way you look after yourself?	**0.54**	−0.01
5. Does it affect jobs you do around the house?	**0.71**	−0.04
6. Does it affect jobs you do for the children at home?	**0.84**	−0.13
7. Does it affect jobs you do for the children outside the home?	**0.63**	−0.01
9. Does it affect you leaving the house?	**0.54**	0.17
10. Does it affect spare time activities?	**0.55**	0.21
11. Does it affect your friendships?	**0.41**	0.19

Items with high factor loadings are indicated in bold.

Table 4
Correlation coefficients of baseline DISP factor scores with questionnaire-assessed depression symptoms.

	Independent variable (baseline):		
Dependent variable (baseline):	**Factor 1 (impairment in routine tasks/activities)**	**Factor 2 (impairment in family functioning)**	**Total DISP score**
SCAN depression symptoms	0.535***	0.318***	0.575***
BDI score	0.499***	0.207*	0.463***
HADS score	0.536***	0.244**	0.499***
PHQ9 score	0.523***	0.201*	0.478***

SCAN, Schedules for Clinical Assessment in Neuropsychiatry; BDI, Beck Depression Inventory; HADS, Hamilton Anxiety and Depression Scale; PHQ, Patient Health Questionnaire.

* $P < .05$.
** $P < .001$.
*** $P < .001$.

3.2. Reliability

Reliability analysis at baseline for the entire scale was good, with a Cronbach's alpha of 0.82. Reliability analyses of the two factors revealed that Factors 1 and 2 had Cronbach's alphas of 0.82 and 0.60, respectively. The alpha for Factor 2 was deemed sufficient given that this factor comprised only three items. Removing any individual items did not improve total scale nor subscale reliabilities. Due to the small number of parents who provided data on a past episode at all three assessments ($n=7$), test–retest reliability was only carried out on those who reported on a current episode of depression at each assessment ($n=47$). Stability of scores across baseline and subsequent assessments was good, with all test-retest correlations significant at $P < 0.05$ (Pearson's $rs=0.3$–0.5).

3.3. Construct validity

In tests of convergent validity for baseline data, both factors and scale total scores were significantly associated with depression symptoms (BDI, SCAN, HADS, and PHQ) as shown in Table 4.

In additional tests of convergent and divergent validity for each factor at baseline, we found that Factor 1 ("impairment in routine tasks and activities") was significantly correlated with measures of general impairment (i.e. EuroQol, $r=0.42$, $P < 0.001$), but not with measures assessing family functioning (MAT, $r=0.15$, $P=0.109$, PASQ, $r=0.14$, $P=0.081$, and CRPBI, $r=-0.06$, $P=0.461$). We found significant associations between Factor 1 scores and the cohesion ($r=0.22$, $P=0.004$) and conflict ($r=0.18$, $P=0.023$) subscales of the FES, but the magnitude of these associations was markedly smaller than for all other correlations used to assess convergent validity in this factor.

As Factor 2 ("impairment in interactions with family members") comprises questions on interaction with the respondent's child, partner, and extended family, we utilised measures of family interaction to test convergent validity. These revealed significant correlations between Factor 2 scores and the FES cohesion ($r=0.32$, $P < 0.001$) and conflict ($r=0.22$, $P=0.01$) subscales. Additionally, there were significant correlations between Factor 2 scores and measures of child interaction, such as the PASQ ($r=0.22$, $P=0.013$) and CRPBI ($r=0.25$, $P=0.007$). However, Factor 2 scores were not significantly correlated with measures of partner interaction (i.e. the Marital Adjustment Test).

3.4. Discrimination

Baseline scores for Factor 1 (OR=1.45, CI=1.28–1.64, $P < 0.001$), Factor 2 (OR=1.49, CI=1.19–1.86, $P < 0.001$) and the entire scale (OR=1.40, CI=1.25–1.57, $P < 0.001$) were able to discriminate parents who met DSM-IV criteria for a current depressive episode from those who did not, as measured by the SCAN.

3.5. Criterion validity

Overall, baseline total, Factor 1 and Factor 2 scores significantly predicted parent depression symptoms at the second and third assessment as measured by the SCAN, BDI, and HADS (see Table 5). In addition, baseline parent DISP factor scores and total scores were significantly associated with child depression symptoms at subsequent assessments, although total scores showed a borderline association with symptoms at the third assessment (see Table 5). When regressing child new onset mood disorder on baseline parent DISP scores we found that only Factor 1 and total scores predicted whether the parent's child went on to develop a mood disorder at subsequent assessments (see Table 6).

Table 5
Regression of depression symptoms at the second and third assessment on baseline DISP factor and total scores.

		Independent variable (baseline):											
		Factor 1 (impairment in routine tasks/activities)				Factor 2 (impairment in family functioning)				Total DISP score			
	Dependent variable:	*B*	Standard error	*β*	*P*	*B*	Standard error	*β*	*P*	*B*	Standard error	*β*	*P*
Second assessment	SCAN depression symptom score	0.046	0.011	0.248	< 0.001	0.301	0.099	0.195	0.003	0.135	0.035	0.247	< 0.001
	BDI depression symptom score	0.122	0.023	0.316	< 0.001	1.418	0.416	0.217	0.001	0.755	0.147	0.317	< 0.001
	HADS depression symptom score	0.456	0.074	0.345	< 0.001	0.601	0.175	0.212	0.001	0.343	0.061	0.336	< 0.001
	Child CAPA depression symptom score*	0.023	0.010	0.139	0.023	0.052	0.023	0.145	0.026	0.019	0.008	0.143	0.028
Third assessment	SCAN depression symptom score	0.037	0.011	0.210	< 0.001	0.143	0.092	0.100	0.121	0.093	0.032	0.183	0.005
	BDI depression symptom score	0.116	0.026	0.260	< 0.001	1.440	0.483	0.185	0.003	0.728	0.171	0.262	< 0.001
	HADS depression symptom score	0.424	0.076	0.310	< 0.001	0.496	0.181	0.169	0.007	0.287	0.064	0.273	< 0.001
	Child CAPA depression symptom score*	0.022	0.011	0.125	0.043	0.053	0.024	0.141	0.032	0.018	0.009	0.130	0.050

DISP, Depression Impairment Scale for Parents; SCAN, Schedules for Clinical Assessment in Neuropsychiatry; BDI, Beck Depression Inventory; HADS, Hamilton Anxiety and Depression Scale; CAPA, Child and Adolescent Psychiatric Assessment.

* Child-rated.

Table 6
Univariate logistic Regression of child new onset DSM-IV mood disorder (NOMD) on baseline DISP scores.

	Dependent variable: NOMD		
Independent variables: baseline DISP scores	**OR**	**95% CI**	***P***
Factor 1 (Impairment in routine tasks/activities)	1.12	1.02-1.22	0.016
Factor 2 (Impairment in family functioning)	1.20	0.96-1.49	0.106
Total DISP score	1.09	1.01-1.18	0.026

4. Discussion

This study assessed the validity of the DISP, a new measure to assess impairment in depressed parents. This measure demonstrates reliability and validity and thus can be utilised by researchers investigating intergenerational transmission of depression. Exploratory factor analysis demonstrated that the DISP comprises two factors – impairment in routine tasks and activities, and impairment in familial functioning – that account for a substantial proportion of explained variance. Reliability analyses showed internal consistency and stability for both factors. Upon establishing the existence of these factors, we assessed construct and criterion validity using previously validated measures of depression symptoms, global functioning, and familial functioning. We found significant correlations between scores on both factors and established questionnaires assessing parent depression symptoms (BDI, SCAN, HADS, and PHQ), suggesting that both factors index depression. However, the fact that these correlations are significant but moderate in magnitude indicates that the DISP indexes a related though distinct construct from depression symptoms. The discordance between symptoms and impairment is interesting in light of the fact that the DISP retains the ability to predict depression symptoms at subsequent assessments. This provides further evidence that it is important to consider impairment in addition to symptom counts.

As each factor assessed specific domains of functioning within depression-associated impairment (i.e. impairment in routine tasks and activities, and family functioning), and because depression-associated impairment does not necessarily coincide with depression symptoms (McKnight and Kashdan, 2009), we assessed convergent and divergent validity for each factor with additional correlations. For Factor 1 we found significant correlations with EuroQol score and non-significant associations with measures assessing family functioning (i.e. MAT, PASQ and CRPBI), indicating that Factor 1 represents impairment in general functioning rather than impaired family functioning. Conversely, scores on Factor 2 were significantly associated with measures of family functioning (PASQ, CRPBI, and FES cohesion and conflict subscales), but were not significantly associated with EuroQol score. In sum, correlations assessing construct validity provide support that the identified factors measure related but distinct constructs to previously validated assessments (i.e. impairment specifically associated with depression), but also measure distinguishable constructs from each other (i.e. functioning in routine tasks/activities versus family functioning).

Additionally, total scores and scores for each factor displayed criterion validity, with all three composites significantly predicting participants' number of depression symptoms at follow-up. These associations support the predictive validity of the DISP as one would expect increased impairment to be associated with a less favourable prognosis. In addition, baseline DISP scores indexed poorer outcomes for offspring with both factor and total scores being associated with child depression symptoms at subsequent assessments. Interestingly, only Factor 1 (impairment in routine tasks/activities) and total scores were significantly associated with children developing a new onset mood disorder. A possible explanation for our null findings might be that the small number of children with new onset mood disorders ($n=33$ when restricted to parents with data on Factor 2) may have decreased our ability to detect an association for Factor 2. The fact that we do find associations between this factor and child depression symptoms at follow-up, whereby we are able to utilise data from the entire sample, supports this possibility. Depression symptoms are also important to consider, given that previous research implicates child depression symptoms as strong predictors of future affective disorders (e.g. Angold et al., 1999; Fergusson et al., 2005; Pine et al., 1999). Finally, in cross-sectional analyses, total and factor scores were able to identify those parents who met DSM-IV criteria for a major depressive episode, providing evidence that the DISP has good discriminatory ability.

However, whilst analysis of the individual factors is important for theoretical reasons, we recommend that in practice researchers and clinicians utilise DISP total scores rather than scores for the individual factors. This recommendation is based on the fact that total scores appear to more robustly predict both parent and child outcomes than the individual factors, as well as the observation that Factor 2 accounts for a small proportion of additional variance.

There are several limitations of our study. First, due to the exclusion of question 8 ("Do you work outside the home?"), the DISP does not contain any questions assessing occupational

impairment. This may result in some individuals appearing "unimpaired" when in fact their depression prevents them from working or causes significant problems with work. However, impairment in this domain may be less salient to offspring and thus may be less relevant when investigating intergenerational transmission of depression. In our sample, we found that the relationship between work impairment and child depression symptoms to be non-significant (MFQ, $r=-.03$, $P=.812$; CAPA depression symptoms; $r=.05$, $P=.625$) although this should be interpreted with caution due to the small sample size. Future work could examine this association in larger samples.

Second, there was a high proportion of missing data for question 2, "Does it affect how you get on with your partner?" with 12.8% of participants responding "not applicable" to this question. This possibly contributed to the finding that Factor 2 scores were not significantly correlated with measures of partner interaction, such as the Marital Adjustment Test. We found that the pattern of results remained similar when we excluded this item from item totals, however this is an additional area in which studies utilising larger samples might provide more information on this finding. As the small number of items comprising this factor may have contributed to this null finding, further qualitative research may be used to generate additional items to include in this factor.

Third, the majority of our sample is female (93.4%), and there is research suggesting that intergenerational transmission of depression may differ depending on the gender of the parent (Branje et al., 2010). We found no significant differences between total or individual item DISP scores for mothers and fathers in our sample. However, future studies should seek to validate the DISP in samples comprising equal numbers of males and females (or male-only samples) with recurrent depression before it can be concluded that this instrument is efficacious in assessing depression-associated impairment in fathers.

In spite of these limitations, the study design confers a number of advantages. First, our sample is derived from the Early Prediction of Adolescent Depression study, which consists of over 300 families of recurrently depressed parents and their children. Typically, samples of this nature and size are rare, thus providing us with a unique opportunity to examine the efficacy of our measure in the target population. Second, the longitudinal design provides multiple observations per subject and thus makes it possible to examine test–retest reliability. Third, the availability of both parent and child data provided an additional way to examine validity for our measure. Ultimately, the design of this study is apt to examine intergenerational transmission of depression.

Identifying risk factors for adolescent depression is crucial to inform intervention and treatment, especially in high-risk samples. For children who are at high-risk by virtue of having a depressed parent, a novel route for research is to investigate the role of depression-specific parental impairment. At present this is rarely studied due to a lack of validated parent impairment measures, hence most research uses depression symptoms as a proxy for impairment. This can be problematic as recent research demonstrates that depression symptoms and impairment are not always concurrent. A validated instrument assessing depression-associated parental impairment would therefore benefit researchers investigating intergenerational transmission of depression; the DISP attempts to address this need.

Our results suggest that the DISP is a reliable instrument for the assessment of depression-associated impairment in parents, with good construct and criterion validity. However, our results lead us to recommend that clinicians and researchers utilise total DISP scores rather than scores for the individual factors. It is hoped that, with additional validation in larger samples and those comprising more males, this instrument could be used to more comprehensively capture salient features of depression that extend beyond current diagnostic criteria for depression (i.e. symptom counts). The use of this instrument in both clinical and research settings could be used to inform treatment and identify mechanisms that confer risk to offspring, ultimately benefitting both depressed parents and their children.

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Appendix A

See Table A1.

Table A1
Depression Impairment Scale for Parents (DISP).

	Baseline response rates *n* (%)	
Thinking about when you experience low mood and other depressive symptoms, please answer the following:	**Current episode**	**Past episode**
1. Does it affect how you get on with your child?		
0—No	52 (30.6)	53 (32.3)
1—Yes, a bit	80 (47.1)	67 (40.9)
2—Yes, a lot	37 (21.8)	41 (25.0)
Missing/NA	1 (0.6)	3 (1.8)
2. Does it affect how you get on with your partner?		
0—No	24 (14.1)	26 (15.9)
1—Yes, a bit	53 (31.2)	53 (32.3)
2—Yes, a lot	71 (41.8)	67 (40.9)
Missing/NA	22 (12.9)	18 (11.0)
3. Does it affect how you get on with people in your extended family?		
0—No	79 (46.5)	79 (48.2)
1—Yes, a bit	48 (28.2)	48 (29.3)
2—Yes, a lot	40 (23.5)	37 (22.6)
Missing/NA	3 (1.8)	0 (0)
4. Does it affect the way you look after yourself?		
0—No	80 (47.1)	102 (62.2)
1—Yes, a bit	50 (29.4)	37 (22.6)
2—Yes, a lot	40 (23.5)	25 (15.2)
Missing/NA	0 (0)	0 (0)
5. Does it affect jobs you do around the house?		
0—No	40 (23.5)	53 (32.3)
1—Yes, a bit	51 (30.0)	46 (28.0)
2—Yes, a lot	78 (45.9)	65 (39.6)
Missing/NA	1 (0.6)	0 (0)
6. Does it affect jobs you do for the children at home?		
0—No	84 (49.4)	96 (58.5)
1—Yes, a bit	53 (31.2)	45 (27.4)
2—Yes, a lot	33 (19.4)	22 (13.4)
Missing/NA	0 (0)	1 (0.6)
7. Does it affect jobs you do for the children outside the home?		
0—No	113 (66.5)	101 (61.6)
1—Yes, a bit	38 (22.4)	35 (21.3)

Table A1 (*continued*)

Thinking about when you experience low mood and other depressive symptoms, please answer the following:	Baseline response rates *n* (%)	
	Current episode	**Past episode**
2—Yes, a lot	19 (11.2)	27 (16.5)
Missing/NA	0 (0)	1 (0.6)
8. Do you work outside the home?		
0—No	76 (44.7)	61 (37.2)
1—Yes	93 (54.7)	103 (62.8)
Missing/NA	169 (99.4)	0 (0)
8a. If YES, does it affect doing your job?		
0—No	50 (29.4)	42 (25.6)
1—Yes, a bit	26 (15.3)	30 (18.3)
2—Yes, a lot	17 (10.0)	30 (18.3)
Missing/NA	77 (45.3)	62 (37.8)
9. Does it affect you leaving the house?		
0—No	73 (42.9)	71 (43.3)
1—Yes, a bit	52 (30.6)	45 (27.4)
2—Yes, a lot	42 (24.7)	46 (28.0)
Missing/NA	3 (1.8)	2 (1.2)
10. Does it affect spare time activities?		
0—No	56 (32.9)	52 (31.7)
1—Yes, a bit	63 (37.1)	58 (35.4)
2—Yes, a lot	48 (28.2)	52 (31.7)
Missing/NA	3 (1.8)	2 (1.2)
11. Does it affect your friendships?		
0—No	64 (37.6)	80 (48.8)
1—Yes, a bit	60 (35.3)	47 (28.7)
2—Yes, a lot	40 (23.5)	36 (22.0)
Missing/NA	6 (3.5)	1 (0.6)

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