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Cognitive styles and psychological functioning in rural South African school students: Understanding influences for risk and resilience in the face of chronic adversity

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ABSTRACT

Adverse childhood experiences can show lasting effects on physical and mental health. Major questions surround how children overcome adverse circumstances to prevent negative outcomes. A key factor determining resilience is likely to be cognitive interpretation (how children interpret the world around them). The cognitive interpretations of 1025 school children aged 10–12 years in a rural, socioeconomically disadvantaged area of South Africa were examined using the Cognitive Triad Inventory for Children (CTI-C). These were examined in relation to psychological functioning and perceptions of the school environment. Those with more positive cognitive interpretations had better psychological functioning on scales of depression, anxiety, somatization and sequelae of potentially traumatic events. Children with more negative cognitions viewed the school-environment more negatively. Children living in poverty in rural South Africa experience considerable adversity and those with negative cognitions are at risk for psychological problems. Targeting children's cognitive interpretations may be a possible area for intervention.

Background

The cognitive processes that are needed to develop in childhood in order to help individuals make sense of the complexities of the world around them are formidable. A child's cognitive style, which incorporates their views of themselves, the world, and the future, involves processes where a child learns to understand events around them, as well as interpret the varied social interactions, both predictable and unpredictable, that they encounter. In this study we explore how children interpret their world and the impact this might have on their current mental state.

Abbreviations: CTI-C, Cognitive Triad Inventory for Children; YSR, Youth Self-Report; TSCC-A, Trauma Symptom Checklist for Children Alternate Form; SDQ, Strength and Difficulties Questionnaire.

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Major questions remain as to how children overcome adverse circumstances. Central to this subject is the need to identify risk and protective mediating factors (Masten, 2014). Resilience may stem from a variety of sources including warm relationships; brief, repeated negative experiences within a supported environment enabling individuals to develop coping skills; and certain styles of self-reflection (Rutter, 2013). While resilience research has progressed considerably across disciplines, many questions remain unanswered. Evidence from children in areas of armed conflict suggests that resilience is a complex process affected by person-specific and time-specific variables (Tol, Song, & Jordans, 2013), with individual factors, such as optimism and mental flexibility, potentially protective in adverse circumstances.

A key factor in determining resilience is likely to be the cognitive style by which children interpret events around them. This affects their long-term adjustment and behaviour and plays an important role in their social competence and peer interactions (Friedman & Chase-Lansdale, 2002). Attributions of events, their interpretations, and memories created are central to cognitive theories as they mediate the impact of environmental stressors on emotional problems, whilst maladaptive beliefs, certain cognitive styles, and information processing biases increase risk (Williams & Riskind, 2004). According to Beck's Cognitive Triad, depressive disorders are characterised by negative views of the self (e.g., I am worthless), the world (e.g., 'the world is unfair'), and the future (e.g., 'the future is hopeless'; Beck, Rush, Shaw, & Emery, 1979). Therefore, negative interpretation styles are attributed to dysfunctional attitudes stemming from negative self-schemata (Beck, 1987). Individuals who do not display such negative cognitive styles are more "protected" from emotional and behavioural problems following stressful events. In order to better understand the cognitive processes contributing to resilience, research looking at positive outcomes is also required (Tol et al., 2013). While events can be clearly negative there are still degrees to which they can be interpreted in terms of relative negativity and its implications for how that particular child interprets, for example, his or her future. We call this cognitive interpretation. While adverse childhood experiences can have long-term negative consequences, "under the right circumstances, the brain can re-enter plastic states, and negative outcomes may be mitigated, even later in life" (Karatoreos & McEwen, 2013). As cognitions could therefore be considered as plastic and amenable to modification, they are a prime area for promoting resilience in disadvantaged populations (Davidson & McEwen, 2012), and are the basis upon which Cognitive Behavioural Therapy (CBT), the recommended treatment for a range of disorders (NICE), was developed.

Cognitions and chronic adversity

Adverse childhood experiences are associated with later negative effects on physical and mental health (Danese & McEwen, 2012; Karatoreos & McEwen, 2013). The question remains as to why certain children are relatively unaffected whilst others are not. One possible explanation lies in the cognitive processes of these children.

It is hypothesised that in an environment of chronic adversity, children may be at risk of developing negative cognitive biases which can lead to increased rates of depression and anxiety (Daleiden & Vasey, 1997). An example of this could be a child who has experienced how an HIV positive parent manages stress and stigma, might then have a more negative bias in evaluating events relating to themselves (negative self-bias). Therefore disagreement with a friend at school might not be attributed to a simple difference of opinion, but be interpreted by the child as proof that no one would ever want to be their friend. Another example of giving more weight to negative rather than positive views of themselves or events (Williams & Riskind, 2004) could be if a child sees a friend playing in the playground. They misinterpret their friend's concentration on a game as their being ignored and excluded from the game because they are not likeable rather than because they have not been seen. This negative attributional style has been linked with depression in children (LaGrange, 2008; Schepman, Fombonne, Collishaw, & Taylor, 2014; Schwartz, Kaslow, Seeley, & Lewinsohn, 2000) and negative cognitions and emotions have also been found to mediate the effect of life experiences on behavioural problems in children (Robinson, Garber, & Hilsman, 1995). Similar findings have been described with regard to aggressive behaviour with negatively biased cognitive processing leading to increased hostile attributions in children and more aggressive behaviour (Dodge, 2006).

Despite the increasing evidence that negatively biased cognitive processes are related to emotional disorders and are a potential area for intervention (Alloy & Riskind, 2005; Harrington, 2002), little research has investigated these processes in children in low and middle-income countries (LMIC) (LaGrange, 2008). In southern Africa, for example, there is a legacy of poverty, limited access to services, high HIV/AIDS prevalence and poor sanitation that contribute to poor maternal health and infant mortality, alongside limited social resources to manage those more vulnerable (Bhorat & Kanbur, 2006). Along with limited healthcare, schools are poorly resourced and there is a dearth of psychological services, greatly affecting children and adolescents' opportunities to fulfil their developmental potential (Fazel, Patel, Thomas, & Tol, 2014; Viner et al., 2012; Walker et al., 2011). Schools, nevertheless, have the potential to play an important role in children's lives. Children's experiences and interactions with peers and teachers, as well educational opportunities, help them to learn about the many intricacies of the world around them. Therefore, their developing sense of self and self-efficacy, their view of the world and themselves, can be shaped and influenced through the school environment. In addition, support from school staff can be an important protective factor, especially for those from more disadvantaged backgrounds (Dubois et al., 1995) and positive relationships within school can be particularly powerful for those with few other positive experiences (Luthar et al., 2000). Although most of these children are living with high levels of adversity, many manage to cope effectively. Understanding the factors that could contribute to their resilience is important, in particular, gaining an understanding of how specific processes, such as cognitions, may be impacted in children in these communities. This could inform the development of

preventive-type interventions focused on resilience building, following either acute or chronic exposure to life events (Bonanno & Diminich, 2013; Fatusi & Hindin, 2010).

Current study

This study examines the cognitive interpretations and psychological functioning of 10–12 year old children in a rural, socioeconomically disadvantaged area of South Africa with high HIV prevalence. Children at the end of primary school were selected because difficulties often emerge at this stage as they approach puberty (Kessler et al., 2005; Smith, Cowie, & Blades, 2003), and because they are more able to reliably report on their psychological state (Mellor, 2004). We define resilience as the absence of psychological problems as well as the presence of positive social skills despite exposure to chronic adversity including high rates of HIV within the community. Within this population, we have studied the risk and protective factors associated with psychological functioning (Cortina et al., 2013), and therefore seek to further elucidate the potential role of cognitive interpretation in understanding the resilience of this population.

Methods

Study setting, design and participants

The research was conducted in the Agincourt subdistrict of Mpumalanga Province in South Africa bordering Mozambique, an area covered by a health and sociodemographic surveillance system (Agincourt HDSS) (Kahn et al., 2012) where, since 1992, systematic sociodemographic data has been collected in 27 villages with some 70,000 people. Health and social transitions have been monitored, with a myriad of potentially related prospective factors collected. Children in the area have been exposed to considerable adversity; the area has a substantial former refugee population from Mozambique. Approximately half the children aged 6–15 years live with both parents, many fathers being migrant or absent (Meintjes). A third of all deaths in the site are attributed to HIV (Tollman et al., 2008).

The data presented here comes from a large cross-sectional study conducted in 2007 from a stratified random sample of children from 10 of the 28 primary schools in the study site (Cortina et al., 2013). Stratification was based on the most recent school performance ratings provided by the Provincial Department of Education (DoE). This data was linked to the Agincourt HDSS to allow for examination of related contextual factors.

Research ethics approval was obtained from the University of the Witwatersrand (M070221), and the local Department of Education and School Governing Bodies as well as the Oxford Tropical Research and Ethics Committee (008-07). Informed consent was obtained from children, parents and class teachers.

We obtained data from 1228 children in grades 4 and 6 (roughly 10 and 12 years old) who were attending the 10 schools. Parental consent and child assent was obtained for 85% of all selected children. Eighteen students did not complete the questionnaires or were absent, leaving a final sample of 1025 children (521 boys and 504 girls), of which 40% were from former refugee households. 585 children were in Grade 4 (57.1%) and 440 children were in Grade 6.

Measures and statistical methods

Based on Beck's cognitive triad, children's cognitive interpretation (their view of themselves, the world, and the future) was assessed using the Cognitive Triad Inventory for Children (CTI-C) (Kaslow, Stark, Printz, Livingston, & Ling Tsai, 1992) and scores were examined to identify the valence of cognitive interpretations (negative to positive). Scores on the CTI-C range from 0 to 72, the scale has no cut-off but low scores indicate a more negative cognitive style. The items were translated into Shangaan (the local language) and back-translated. As the scale has not been previously used in South Africa, the psychometric properties were examined prior to further analyses.

As an indicator of children's cognitive interpretation, a one-factor structure for the CTI-C was applied indicating how positively or negatively children interpret situations. Alternative factor structures with one and three latent variables (unobserved constructs) were also tested to rule out a three-factor structure consistent with Beck's model. In order to obtain an indication of the valence (positivity/negativity) of children's cognitive interpretation, mean scores were compared to those reported in a meta-analysis ($N = 1355$) of studies from higher-income countries (Ingram, Nelson, Steidtmann, & Bistricky, 2007). Scores were also calculated on the three subscales to identify children's views of themselves, the world and the future. Only one published study has examined the psychometric properties of the CTI-C in over 800 American adolescents (Greening, Stoppelbein, Dhossche, & Martin, 2005). Their findings were potentially consistent with Clark and Watson's (2001) model for anxiety and depression as the items possibly reflected the extent to which the child feels positively engaged in life (positive affect) versus the extent to which they are unpleasantly engaged (negative affect).

Several questionnaires assessing different aspects of psychological functioning in children were used to capture the diverse range of potential psychological outcomes. All questionnaires were translated into Shangaan (the local language) and back-translated and the psychometric properties examined (Cortina et al., 2013). Rates of difficulty and risk and protective factors are reported elsewhere (Cortina et al., 2013). The included questionnaires were the anxious/depressed and somatic scales of the Child Behaviour Checklist Youth Self-Report (CBCL-YSR; Achenbach, 1991), the Trauma Symptom Checklist for Children (TSCC-A) anger and post-traumatic stress scales (PTS; Briere, 1996), and the prosocial behaviour scale of the Strength

and Difficulties Questionnaire (SDQ; Goodman, 1999) as well as the teacher reported SDQ total difficulties score (Goodman, 1999). Six additional items regarding perception of the school environment, adapted from a questionnaire assessing social literacy in schools (Prothrow-Stith, Chéry, & Oliver, 2001), were examined in relation to children's cognitive interpretations. The items featured a four-point Likert-type scale, indicating whether the item happened "All of the time" to "Never", for example "I feel close to people at this school" and "Kids in my class look out for each other".

Statistical analyses were performed using SPSS (Version 20.0). Descriptive statistics were examined and an independent samples *t*-test was used to compare the study sample CTI-C mean to those published in the meta-analytic study (the only comparative sample available) (Ingram et al., 2007). Pearson correlations were examined to identify the relationship between children's cognitive interpretations and their psychological functioning. Spearman correlations were used to identify socio-odemographic correlates of cognitive interpretation. These included age and sex of household head, number of child grants per household, refugee status, deaths in last year in household, mother status (alive/deceased), location (same household/elsewhere), and relationship status. Of the variables examined, only mother union type, school grade and duration breastfed were significantly correlated. Stepwise multiple regressions were then used to identify sociodemographic predictors of cognitive interpretation style. A comparison was also made between children who were from refugee households and those who were not, as they may have been exposed to additional stressors. Possible moderation of cognitive interpretation was examined using regression analysis. As the literature shows a relationship between anxiety and depression and cognitions, we were interested whether cognitions moderate the impact of SES on anxious/depressed scores. We tested a number of moderation models using SES, type of government support grant being received, and family refugee status for several of the key psychological indicators (YSR anx/dep and TSCC-PTS). Variables were standardised prior to the regression and SES scores from 2007 were used to examine this.

To further examine the relationship between cognitive interpretation and post-traumatic stress (PTS), which may provide an indication of exposure to stressors, children were split into two groups based on the lower and upper quartiles of more negative and more positive cognitive interpretations. Analysis of Variance (ANOVA) was used to determine whether children with negative cognitive interpretations had significantly more PTS symptoms.

Results

Psychometric properties

The reliability of the CTI-C Total Score was strong ($\alpha = .82$). The View of Self ($\alpha = .63$) and View of World ($\alpha = .65$) scales demonstrated moderate reliability, and the View of Future scale had poor reliability ($\alpha = .49$). The alternative multi-factor models were not as strong as the one-factor model (Table 1). Competitive one-factor models were tested by removing items with the lowest factor loadings (<.07), but did not improve reliability (RMSEA = .051 [90% CI .049, .053], $p < .001$; TLI = .789; CFI = .812).

Descriptive statistics

Children's cognitive interpretation style (CTI-C Total) scores ranged from 3 to 64 ($M = 43.90$, $SD = 11.50$) (Table 1). Children scored significantly lower than those in comparative studies (n = 1355, $M = 56.62$, $t = -35.41$, $df = 1024$, $p < .001$, d = −2.21), indicating more negative/depressive cognitive interpretations (Ingram et al., 2007). There was no significant difference in cognitive interpretation for children from refugee households compared to the other households ($t = -1.47$, $df = 822$, $p = .82$, $d = -.102$).

Table 1
Descriptive statistics for scales used.

	Mean	SD
CTI-C total score	43.90	11.50
View of self	15.21	4.53
View of world	14.58	4.70
View of future	14.10	3.94
YSR anxious/depressed scale	9.98	4.18
YSR somatic scale	8.54	3.87
TSCC-A anger	7.74	5.64
TSCC-A post-traumatic stress (PTS)	12.73	5.95
SDQ prosocial behaviour	6.26	1.99
SDQ total difficulties (teacher-reported)	15.01	5.02

Note: N = 1025.
CTI-C (Cognitive Triad Inventory for Children); YSR (Youth Self-Report); TSCC-A (Trauma Symptom Checklist for Children Alternate Form); SDQ (Strength and Difficulties Questionnaire).

Association with psychological functioning

Correlations between children's scores on the CTI-C and multiple psychological measures were examined (Table 2). CTI-C scores were associated with YSR anxious/depressed scores ($r = -.23$, $p < .01$), somatic symptoms ($r = -.15$, $p < .01$), anger ($r = -.32$, $p < .01$), post-traumatic stress symptoms (PTS; $r = -.19$, $p < .01$), as well as prosocial behaviour ($r = .11$, $p < .01$), whereby children with more negative cognitive interpretations reported greater psychological difficulties and less prosocial behaviour. Teacher-reports yielded similar findings for prosocial behaviour ($r = .11$, $p < .01$), but the relationship with teacher-reported total difficulties was not significant. Thus those with more positive cognitive interpretations were more prosocial on both self and teacher reports.

Stepwise multiple regression found that grade ($\beta = 3.09$, $p < .01$) accounted for 9.6% of the variance in cognitive interpretation ($R^2 = .096$). Younger children had significantly ($t = -9.13$, $df = 1023$, $p < .001$, $d = -.57$) more negative cognitive interpretations ($M = 41.16$, $SD = 10.95$) than older children ($M = 47.54$, $SD = 11.22$).

There were no gender differences in cognitive interpretation, with boys ($M = 44.15$, $SD = 11.50$) and girls ($M = 43.63$, $SD = 11.51$) showing similar levels.

Cognitive interpretation as a moderator

Linear regression was used in order to examine moderation effects between SES, cognitive interpretation, and post-traumatic stress on anx/dep scores. The analysis indicated that about 27% of the variation in the dependent variable (i.e., depression) could be explained by the main effects and the interaction effects ($R^2 = .27$, adjusted $R^2 = .27$, $F(3, 903) = 110.86$, $p < .001$). Two of the main effects were significant and contributed uniquely to high levels of anx/depression: PTS ($\beta = .44$, $t = 15.19$, $p < .001$) and cognitive interpretation ($\beta = -.19$, $t = -6.34$, $p < .001$). On its own, SES was not a significant predictor ($\beta = -.03$, $t = -1.16$, $p = .25$). Furthermore, the results indicated that a moderator effect was significant, controlling for SES. This was the interaction between cognitive interpretation and SES ($B = -.06$, $\beta = -.03$, $t = -2.17$, $p = .03$). For example, a student with more positive cognitive interpretations (ie, CTI-C = 69), higher SES (ie, SES = 3.5), and a high level of post-traumatic symptoms (ie, PTS = 30) would have very low predicted levels of anxiety/depression (ie, anx/dep = .33), compared to a student with more negative cognitive interpretations (CTI-C = 3) and the same SES and PTS scores, who would have a higher level of anxiety/depression (ie, anx/dep = 12.62).

Cognitive interpretation and post-traumatic stress (PTS) symptoms

The high level of socioeconomic disadvantage in the area, in combination with high rates of HIV/AIDS, prompted further examination of the relationship between symptoms of post-traumatic stress and children's cognitive interpretations. Children were divided according to cut-offs for normal, borderline, and abnormal on the PTS. Children with high levels of PTS symptoms had more negative cognitive interpretations than those in the normal range (Table 3). Children classified as having negative cognitions (as determined by quartiles) had significantly more PTS symptoms than children with positive cognitive interpretations ($F = 54.58$, $df = 1$, $p < .01$, $d = -.64$).

Cognitive interpretation and the school environment

More negative cognitions were related to child reports that children 'push and shove each other in the classroom' ($r = .22$, $p < .001$), 'yell at each other a lot' ($r = .20$, $p < .001$), and that there are 'a lot of fights at school' ($r = .13$, $p < .001$). Children's cognitions had an inverse relationship to several items whereby those with more positive cognitions reported that children in their class 'look out for one another' ($r = -.19$, $p < .001$), 'wait their turn to talk' ($r = -.13$, $p < .001$), and that they themselves 'wait their turn to talk' ($r = -.12$, $p < .001$), they 'feel safe at school' ($r = -.30$, $p < .001$), 'feel close to people at school' ($r = -.18$, $p < .001$), and 'learn a lot at school' ($r = -.30$, $p < .001$).

Discussion

All children in this study come from a rural, socioeconomically deprived setting with widespread exposure to chronically adverse conditions. Not surprisingly, the cognitions of the 1000 children tested were, on average, more negative than those found in samples of children from higher-income countries (Ingram et al., 2007). However, the children in this study showed considerable variation in responses. Those with more positive cognitive interpretations had better psychological functioning on scales of depression, anxiety, somatization and sequelae of potentially traumatic events. Although the correlations were weak to moderate, there was an important, significant relationship between cognitions and psychological functioning. Whilst it can prove difficult to alter children's exposure to adverse events, interventions could potentially modify how these events are interpreted and also alter long term behaviours (Maticka-Tyndale, 2010). Reaching children from these settings whilst at school is particularly important as many are accelerated into adulthood with significant proportions entering employment (predominantly informal), becoming parents and contracting serious diseases before the age of 21.

The development of interventions to modify cognitions, in particular those about a child's future, could help them think differently and potentially alter associated psychological dysfunction. Recent technologies in other settings show

Table 2
Pearson correlations (p) between children's cognitive interpretations and psychological functioning.

	CTI-C total score		View of self		View of world		View of future	
YSR anxious/depressed scale	−.23**		−.21**		−.22**		−.17**	
YSR somatic scale	−.15**		−.16**		−.13**		−.12**	
TSCC-A anger	−.32**		−.30**		−.28**		.27**	
TSCC-A post-traumatic stress	−.19**		−.17**		−.20**		−.13**	
Prosocial behaviour	.26**		.22**		.23**		.24**	
Total difficulties (teacher-reported)	−.04	(.26)	−.06	(.06)	−.04	(.16)	−.02	(.63)
Prosocial behaviour (teacher-reported)	.11**		.10**		.10**		.08*	

*Significant at the .01 level.
**Significant at the .001 level.

Table 3
Cognitive interpretation scores by post-traumatic stress classification.

Post-traumatic stress classification	N	Min	Max	Mean (SD)
Normal	293	8	68	46.67 (12.47)
Borderline	487	12	69	43.39 (10.89)
Clinical	245	14	67	41.58 (10.86)

promise, with some potentially transferable to low intensity, non-expert settings such as rural southern Africa (Kazdin & Rabbitt, 2013). For example, in adults, computer programmes are being developed to present adaptive statements about appraisals after stressful events. Through this cognitive bias modification (CBM), more positive cognitive interpretations have been adopted with reduced levels of depression and anxiety (Woud, Postma, Holmes, & Mackintosh, 2013). Interpretation biases (as targeted in CBT) can be modifiable in adolescence, with theoretical and clinical implications for the development of prevention and early intervention programmes for anxiety and mood disorders in vulnerable young groups (Lothmann, Holmes, Chan, & Lau, 2011). For example, focussing on specific questions in the CTI-C such as 'Nothing is likely to work out for me', and 'My problems and worries will never go away', could be an entry point to help children generate alternative and more adaptive and positive beliefs, scenarios, or images about their future. As this approach has not been investigated in the context of low and middle-income countries, much remains to be done to develop this further.

Of note, children's cognitive interpretations were not associated with teacher-reported total difficulties on the SDQ, highlighting how important it is to ask children directly about these factors. This could be because cognitive interpretations are more likely to reflect anxious and depressed thinking or symptoms rather than behavioural difficulties (Epkins, 2000), and might therefore be harder for teachers to identify (Dwyer, Nicholson, & Battistutta, 2006).

The literature suggests that the experience of negative life events can activate more negative long-term cognitive styles (Muris, 2006). The present study showed that the interaction between cognitions and socioeconomic status influenced anxious and depressed symptoms, which shows some support for previous findings. Moderation effects between socioeconomic status and cognitions imply that the students of higher socioeconomic status and more positive cognitive interpretation reported lower levels of anxiety/depression. However, more research is necessary to elucidate this relationship and provide support for the conceptualisation of cognitive interpretation as a resilience factor. Children growing up in the most adverse circumstances may be at risk of developing negative thought processes, which might increase their long-term risk for depression and anxiety disorders (Calvete & Cardeñoso, 2005). Children's executive functioning at both the neural and behavioural levels can be influenced by individual, family and community systems (Masten, 2014). Given the established and potentially causal role of negative cognitions in anxiety and depression in adults (Mathews & MacLeod, 2002), and the evidence-base for cognitions as a good entry point for interventions, an understanding of these factors in adolescence, as anxiety and depression rates begin to rise, is important (Epkins, 2000). Currently, CBT is the most effective treatment for anxiety, depression, and post-traumatic stress disorder in adults with similar guidance for children, although the evidence-base is poorer (NICE, 2005).

The South African education system is beset with poor quality education with little capacity to help children with difficulties – be they academic or emotional and behavioural. This can lead to children having to repeat an academic year rather than have their needs addressed in any planned manner. Although South Africa has better secondary school completion rates than many LMICs, still many children who drop out of school fail to reach their developmental potential and are at risk of a variety of psychological difficulties later in life. In this sample, those who had more negative cognitive interpretations experience their school environment as relatively difficult, reporting 'many fights' and children 'yell at each other a lot'. Classroom context has been found to influence self-perceptions in children (Kokkinos & Hatzinikolaou, 2011), therefore schools provide a feasible avenue to alter children's cognitions. If children find the school environment positive and supportive, they may be less likely to drop out compared to those who perceive school as negative and unsafe. They might be negatively attributing school because of negative cognitions but there might also be aspects of the school environment that need to be addressed.

Consistent with other studies (Friedman & Chase-Lansdale, 2002), children with more positive cognitive interpretations were more prosocial, and, despite their adverse circumstances, a substantial proportion remained positive with a relatively optimistic outlook. This positivity suggests a source of resilience that could also be harnessed in interventions.

Limitations

This study has a number of limitations. This study was cross-sectional in design and as it was embedded within the rich, prospective data-collection framework of the Agincourt HDSS, the variables collected were predetermined and therefore some potentially relevant variables, such as family history of mental illness or birth order, could not be determined. The linking of children to the Agincourt HDSS data was not possible in all cases, as children can be known by different names or move household. Furthermore, not all sociodemographic data were available for all children, further reducing the sample size. The effect sizes were low to moderate for some of the sociodemographic variables (Cohen, 1988). Although this research used established measures we had to determine the psychometrics for this setting, the findings should be generalised cautiously.

Given the concurrent examination of children's cognitive interpretations and their psychological functioning, it was not possible to ascertain directionality. Research in adults suggests, however, that negative cognitions are involved in the onset, maintenance, and recurrence of depressive symptoms (Teasdale, 1983). Longitudinal studies are necessary to better understand this relationship. In an attempt to further elucidate the impact of different circumstances, we examined a number of sociodemographic variables in relation to children's cognitive interpretations. For the entire sample, grade was the only significant predictor, however for boys, higher grade and having a mother in a stable partnership significantly predicted more positive cognitive interpretations, whereas predictors for girls were grade and longer duration of breastfeeding. It may be that positive cognitive interpretations either mitigates the effect of environmental risk and protective factors or contributes to the process of resilience. For example, a child with a positive view of the future may be more 'protected' from current risk factors and negative life events.

Conclusion

This study has examined cognitive interpretations in children living in an area of chronic adversity, a group not previously studied in this manner. It highlights the prevalence of negative cognitive interpretations. The role of negative cognitions in the development and maintenance of psychological disorders in children is a key question that is attracting interest (Hirsch & Holmes, 2007). Identifying potentially modifiable processes to target in interventions is necessary (Betancourt, Meyers-Ohki, Charrow, & Hansen, 2013) and negative cognitions (such as maladaptive interpretations) are a compelling potential target. Such interventions, if implemented within the school setting for example, could be both feasible and sustainable as this is embedding the intervention within the natural support system of communities and so has the potential to reach the young people that could benefit from it (Fazel et al., 2014).

Coping, self-esteem and hope for the future have all been identified as key individual factors for child resilience (Betancourt et al., 2013). Our findings suggest that children's cognitive interpretations may be an entry point for improving each of these areas. In this study, cognitive interpretations were related to psychological problems and children had more negative cognitions than their counterparts in high-income countries. Developing interventions that harness family, peer and community strengths (Bayer, Gilman, Tsui, & Hindin, 2010) potentially through the school and also delivering low intensity cognitive-behavioural interventions may provide important approaches. Specific negative cognitions have been successfully targeted in numerous studies to treat a range of different disorders (Murray et al., 2014). As demonstrated in the adult literature, low-intensity interventions can be developed and if this experience is translated to children it might be possible to develop interventions that can reach children at this critical period of transition from adolescence to premature adulthood, school to employment, and from being a dependent to becoming a parent.

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