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Research report

Examining reward-seeking, negative self-beliefs and over-general autobiographical memory as mechanisms of change in classroom prevention programs for adolescent depression

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ABSTRACT

Background: Effective methods to prevent adolescent depressive symptoms could reduce suffering and burden across the lifespan. However, psychological interventions delivered to adolescents show efficacy only in symptomatic or high-risk youth. Targeting causal risk factors and assessing mechanistic change can help devise efficacious universal or classroom based prevention programs.

Methods: A non-randomized longitudinal design was used to compare three classroom-based prevention programs for adolescent depression (Behavioral Activation with Reward Processing, "Thinking about Reward in Young People" (TRY); Cognitive Behavioral Therapy (CBT) and Mindfulness Based Cognitive Therapy (MBCT)), and determine cognitive mechanisms of change in these programs. Cognitive mechanisms examined were reward-seeking, negative self-beliefs (assessed with behavioral tasks) and over-general autobiographical memory. 256 healthy adolescents aged 13–14 participated with 236 (92%) and 227 (89%) completing the pre- and post-assessments.

Results: TRY was the only intervention associated with a reduction in depressive symptoms at follow-up. Reward-seeking increased following TRY. In the other programs there were non-significant changes in cognitive mechanisms, with more reflective negative self-beliefs in CBT and fewer over-general autobiographical memories in MBCT In the TRY program, which focused on increasing sensitivity to rewarding activities, reward seeking increased and this was associated with decreased depressive symptoms.

Limitations: Due to the infeasibility of a cluster randomized controlled trial, a non-randomized design was used.

Conclusions: Increased reward-seeking was associated with decreased depressive symptoms and may be a mechanism of depressive symptom change in the intervention with a focus on enhancing sensitivity and awareness of reward. This study provides preliminary evidence to suggest that incorporating activities to enhance reward sensitivity may be fruitful in randomized controlled trials of universal prevention programs for depression.

1. Introduction

Depression is one of the leading causes of burden and disability in the world (Ustun et al., 2004). The prevalence increases markedly during adolescence and adolescent depression is associated with serious social and educational impairments, high relapse rates and mental health problems in adult life (Angold et al., 1999; Dunn and Goodyer, 2006; Fergusson et al., 2005; Weissman et al., 1999). Despite this, adolescent depression is under-recognized, treatment effect sizes are modest and most affected individuals do not receive any intervention (Thapar et al., 2012). Effective programs that prevent adolescent onset depression are therefore needed.

Selective and indicated preventive interventions are delivered to sub-clinically symptomatic populations (Garber et al., 2009; Horowitz and Garber, 2006; Merry et al., 2004a; Stice et al., 2009) whilst universal prevention programs are delivered to all members

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of a group regardless of symptoms. Each approach has advantages and disadvantages but a universal approach, which is the one used in the present study, avoids the need for expensive and imperfect screening procedures and reaches large numbers of individuals including those most vulnerable (Rose, 1992). To date, the majority of prevention programs have used similar approaches to those used in psychological treatments and focus on altering dysfunctional styles of thinking and behavior by challenging negative thoughts (i.e. cognitive therapy based approaches). Although early universal prevention programs using cognitive therapy showed promise (Merry et al., 2004b; Shochet et al., 2001) large scale trials do not support this (Stallard et al., 2012). Different approaches to intervention may be needed for promoting protection against symptoms in unselected groups where individuals may not identify with the symptom-based approaches used to date.

An alternative approach involves aiming to target and change cognitive mechanisms thought to increase the risk of depression because targeting and changing causal factors will alter an outcome (Giesen et al., 2007; Rutter, 2007; Toth et al., 2013). Thus, designing interventions that target potentially causal risk factors and measuring whether interventions do indeed change them is one way of devising efficacious programs (Flay et al., 2005; Kraemer et al., 2002). A need to actively compare different interventions as well as to identify the mechanisms of change has been identified as an important way to expedite innovation and enhance efficacy (Hollon et al., 2002; Merry and Stasiak, 2012).

We selected three cognitive mechanisms for which there was evidence they may be causally involved in adolescent depression (i.e. exist prior to and longitudinally predict the onset of depressive symptomatology). These were 1) reward-processing (Forbes et al., 2007; Rawal et al., 2013b) 2) negative self-beliefs (Abela et al., 2011; Rawal et al., 2013a) and 3) over-general autobiographical memory (Abela et al., 2011; Hipwell et al., 2011; Rawal and Rice, 2012a). We examined whether these were changed through three classroom-based prevention programs which we hypothesized would differentially change these cognitive mechanisms due to the different content and focus of programs. It should be highlighted that some measures of cognition will be more tightly linked to measures of depression due to measurement issues. For instance, greater correlations with depression (which relies on self-reported symptoms) are expected where participants report on their cognitive distortions or biases compared to measures derived from performance on cognitive tasks. It can be argued that performance-based measures provide more objective measures than self-report measures because they allow for the measurement of cognitive biases that may not be open to introspection (Harmer et al., 2009; Rawal et al., 2013a). The use of performance-based cognitive indicators also lessens the likelihood that associations with depression are due to shared method variance which is possible when the same informant rates a risk factor (e.g. cognitive bias) and an outcome (e.g. depressive symptoms) (Rutter et al., 2001). For this reason, we focused on performance-based measures of cognition. We first describe evidence that the three cognitive mechanisms may be causally involved in adolescent depression. We then outline our hypotheses related to cognitive change in the three programs.

Depressed adults and adolescents are insensitive to reward (Eshel and Roiser, 2010; Naranjo et al., 2001). This hypo-sensitivity to reward has been shown to exist prior to and increase risk for later adolescent depression (Forbes et al., 2007; Rawal et al., 2013b). Behavioral activation, which encourages active engagement in interesting and pleasurable activities may increase reward sensitivity (Dichter et al., 2009). Depressed adults and adolescents also show a number of distortions of thoughts and memory that negatively bias the perception and experience of events. Prospective longitudinal studies show that these thought distortions may play a causal role in the onset and maintenance of depression (Beck, 1976; Jacobs et al., 2008; Rood et al., 2009; Watkins, 2008; Williams et al., 2007). Moreover, associations with depression are stronger when endorsements of negative self-beliefs are rapid (and more implicit or automatic) compared to when they are slower (and more reflective) (Sheppard and Teasdale, 2004). Cognitive Behavioral Therapy (CBT) focuses on altering dysfunctional styles of thinking and behavior through challenging such negative thoughts and beliefs. Depression is also associated with difficulties in retrieving specific details of the personal past and this phenomenon of over-general autobiographical memory (OGM) predicts later depressive symptomatology in adolescents (Rawal and Rice, 2012b) and prognosis in depressed adults (Brittlebank et al., 1993; Williams et al., 2007). Mindfulness Based Cognitive Therapy (MBCT) focuses on training attention, acceptance and tolerance of emotional states (Kuyken et al., 2013; Stice et al., 2009) and has been found to reduce OGM in adults (Williams et al., 2000). Accurate knowledge of autobiographical events is important for social problem-solving, the ability to imagine future events, and the regulation of emotional material (Williams et al., 2007).

We compared three types of intervention for which there is evidence they may prevent adolescent depression (Horowitz and Garber, 2006; Kuyken et al., 2013; Merry et al., 2004a; Stice et al., 2009) (Thinking about Reward in Young People [TRY], CBT and Mindfulness-Based Cognitive Therapy [MBCT]. TRY incorporated CBT and behavioral activation and focused on enhancing reward-processing. We predicted that the different interventions would alter different cognitive mechanisms. We asked: 1) Are three potentially causal cognitive risk factors for adolescent depression (reward-processing, negative self-beliefs and over-general autobiographical memory) changed following participation in each intervention? 2) Is change in the cognitive risk factors associated with change in depressive symptomatology? We made the following hypotheses: 1) reward-sensitivity would increase in TRY due to the explicit focus of the program on increasing reward-sensitivity. 2) Negative self-beliefs would reduce and become more reflective in CBT as the program encouraged and supported young people in identifying and evaluating negative thoughts and cognitive distortions. 3) OGM would reduce in MBCT due to the focus on increasing present moment awareness in a non-judgmental way which would encourage participants to encode and retrieve events in more specific ways (Williams et al., 2000).

2. Methods

A non-randomized longitudinal design with three intervention conditions (TRY, CBT, MBCT) and one comparison condition was used. 256 adolescents aged 13–14 years attending three schools in the South East of England, UK, participated. Participants were allocated to groups according to therapist availability and school timetabling. Each intervention was delivered to two separate classes in one of the three schools. Comparison participants came from all three schools with two schools including one class and one school including two classes. A non-randomized design was used because a randomized controlled trial (RCT) would necessitate clustering within classes or schools and would therefore involve an extremely large sample. Given that this was a preliminary study to investigate cognitive mechanisms and the program content and materials were developed for this study, a full cluster RCT would have been premature and unfeasible. The manualized interventions involved 8 weekly sessions delivered by Educational Psychologists during the school day. Sessions took place during personal health and social education (PHSE) lessons and lasted 50 min. The TRY program aimed to enhance reward-processing