THE BIRMINGHAM AUTISM, SCHIZOTYPY, AND EMOTIONS STUDY

(BASES)

by

Felicity Violet Larson

A THESIS SUBMITTED TO THE UNIVERSITY OF BIRMINGHAM

FOR THE DEGREE OF

DOCTOR OF CLINICAL PSYCHOLOGY

Department of Clinical Psychology

School of Psychology

The University of Birmingham

19 May 2017

Volume I:

Systematic review and empirical research paper

Thesis Overview

This thesis is comprised of a systematic review of the role of emotional regulation in bi-polar disorder and an empirical study of factors influencing schizotypal traits, including autistic traits and emotional regulation.

The systematic review found that emotional regulation difficulties appear to underpin many different mental health problems and are not specific to bi-polar disorder. However, the studies in this area to date have varied significantly in their methodology and quality. There is a need for replication and agreed-upon methods to further strengthen findings. Particularly, it is important for studies to consider current levels of symptoms when interpreting results, rather than categorising participants into "symptomatic" or "euthymic" categories. Psychological treatments targeting emotional regulation appear to be effective for people with bi-polar disorder, but are limited in number, and this is an area of obvious future study that would benefit clinicians and patients.

The empirical paper found broad support for previous findings that there is a relationship between traits of autism and schizotypy in a group of neurotypical (n = 43) and autistic people (n = 84). Some of the autistic people had experienced psychosis (n = 25). Affective lability was also found to be a significant predictor of schizotypal traits. Perspective taking and emotional regulation style did not predict schizotypal traits, with the exception that greater use of emotional suppression significantly predicting negative schizotypal traits. Affective lability predicted experience of psychosis in autistic people, but further research is needed that includes measures of current symptoms and their effect.

Acknowledgements

To my participants, particularly those autistic people who have experienced psychosis, I am grateful for their honesty and willingness to share their experiences with me. I am always learning from them and being challenged to think differently by them, which is a tremendous privilege. To all of my participants, I thank them for their time and openness in participating in the study. Without you this truly would not have been possible.

To my collaborators, Professor Anthony Holland, Dr Katharine Chisholm, and Dr Renate Reniers, my thanks for your help and support with all aspects of the project. I would like to thank Professor Stephen Wood especially for his support and guidance throughout this research project, even after he moved to the other side of the world. Not only was he supportive of the work itself, he provided valuable advice and guidance about career trajectories and future plans. I look forward to collaborating with him in future.

My biggest thanks goes to Dr Adam Wagner, my good friend and faithful research companion over the years. Not only is his statistical knowledge always valued and appreciated, he also has a keen editorial eye and a wonderfully disciplined approach to version control that helps to keep me on the right path. This project, as with my other work, wouldn't be half as good without his help and support.

Contents

Volume I

Volume II

Table of Figures

Table of Tables

List of Abbreviations

ER – emotion regulation

HC – healthy controls

AP – autistic people

ASD – autism spectrum disorder

ID – intellectual disability

BP – bipolar disorder

UPD – unipolar depression

BPD – borderline personality disorder

UR – unaffected relative

Literature review: Emotional regulation in bipolar disorder – current understandings and future directions

Abstract

***Aim**: To better understand the role emotional regulation (ER) difficulties play in bipolar disorder, a systematic literature review was conducted. The findings from that review are summarised here.* ***Method:** A systematic search of three databases, PsychInfo, Medline, and Pubmed, was conducted using relevant search terms. Study abstracts were screened for suitability, and then relevant studies were read in full. Reference lists were also checked for relevant studies missed by the database searches. Studies were rated using the STROBE Checklist to compare and consider quality.* ***Results:** Evidence in this area is variable, with little replication, making results difficult to interpret. Compared with other clinical groups, individuals with bipolar appear to struggle with regulating emotional highs, but all clinical groups have difficulty with ER when compared to healthy controls. Relatives of people with bipolar appear to form a midpoint between healthy controls and patients in their ER abilities. Individuals with bipolar may have fewer coping strategies or rely on less helpful coping strategies, but can also successfully learn and apply new coping strategies. There is also limited evidence that psychological treatments targeting ER can benefit people with bipolar.* ***Conclusions:** More research is needed in this field, using agreed-upon standards for study design and methods. Replication studies will be important given the rarity of individuals with bipolar and the likelihood of large individual variation. Also, studies should be careful to consider current level of mood symptoms on a scalar basis, rather than using cut-offs, as mood symptoms affect self-report of ER.*

Introduction

There is an increasing awareness of the importance of dimensional understandings of mental health problems (Brown & Barlow, 2005; Henry et al., 2007). This shift from diagnosis-focus to process-focus is interesting from a psychological perspective, as it fits better with person-centred ideas of formulation and psychological treatment. The focus on dimensions also highlights the limitations of a diagnostic, binary (medical) model of mental wellness-illness and the model's inability to explain the wide variation in experience of and outcomes following periods of severe dysfunction. One such dimension that has been attracting attention in recent decades is that of the experience and management of emotion. All mental health problems involve an element of difficulty with emotion, and emotional difficulty represents a discreet treatment and prevention target.

Attempts to define emotion are difficult as the related concepts of mood and affect are complex. Shouse (2005) has argued that what defines emotion is the social communication of an internal state, whereas affect and feelings are more basic and internal experiences. Gross and John (2003) proposed a different conception of emotion as the interpretation of physiological, behavioural, and experiential cues. Zajonc's (1980) classic paper on affect places it as a precursor to emotion, an automatic and instinctual state that can become an emotion once cognitive and other processes are engaged. Thus, in response to a stimulus, an individual experiences an affective response which then becomes an emotion as this initial response is interpreted. Finally, a pattern of emotions over time can be considered a mood. However, it is worth noting that the use of these terms is frequently confused in the literature and such clear distinctions between the concepts are not always present.

Humans are able to engage in emotion regulation – that is, processes by which they can influence their response to an emotional state. These are often cognitive processes, most

commonly cognitive reappraisal (e.g. changing what one thinks in response to an emotional stimulus in order to change ones' emotional state) or expressive suppression (e.g. attempting to minimise the focus on the emotional state and not act on it) (Gross & John, 2003). When emotion regulation (ER) is not possible, or when attempts to regulate emotion are ineffective, psychological distress may occur. It is easy to conceptualise how a pattern of ineffective ER could lead rise to pathological processes and psychiatric diagnoses.

The psychiatric diagnosis that is perhaps most obviously defined by ER difficulties is bipolar disorder (BP). BP is characterised by changes in emotional states (e.g. shifts into irritability or elation) that can be rapid or slower changes in overall mood state (Grande, Berk, Birmaher, & Vieta, 2016). It is divided into two types, BP-I and BP-II, based on the severity of the mood symptoms. It occurs at a rate of approximately 1% in the general population and has significant effects on functioning, particularly in young adults (Grande et al., 2016). BP being defined fundamentally as a mood disorder suggests ER processes being different in some way that impacts mood. The purpose of this systematic review is to determine what role ER difficulties play in BP, compared to healthy individuals and individuals with other diagnoses. The results may have implications for psychological treatment of BP, as well as prevention in at-risk populations.

Several reviews have been conducted previously that are relevant to the topics covered here. There are three reviews exploring the relationship between borderline personality disorder (BPD) and BP (Coulston, Tanious, Mulder, Porter, & Malhi, 2012; Mackinnon & Pies, 2006; Paris, Gunderson, & Weinberg, 2007), one covering emotional reactivity in BP (Henry et al., 2012), one focussing on psychosocial functioning (Van Rheenen & Rossell, 2014), a third considering ER in children and adolescents as it relates to BP (Dickstein & Leibenluft, 2006), four reviews covering the neurobiological basis for emotional dysregulation in people with BP (Green, Cahill, & Malhi, 2007; Phillips, 2006;

Phillips, Ladouceur, & Drevets, 2008; Townsend & Altshuler, 2012), and two on emotional processing in BP (Ghaznavi & Deckersbach, 2012; Mercer & Becerra, 2013). There has also been a review of psychosocial treatments of BP that considers ER (Reinares, Sánchez-Moreno, & Fountoulakis, 2014). While each of these reviews is related to the question posed in this review, and their results can be useful in considering that question, none of them provides a description of our current knowledge in this area in a systematic or complete way. Thus, the aim of the current review is to synthesize the evidence in this field to answer the following question:

- In what way do those with bipolar disorder differ from other population groups on the basis of self-reported and/or behaviourally measured ER and coping styles?

It should be noted that throughout this review, medical-model terminology and ideas will be used, despite the focus on a dimensional concept. This is a feature of attempting to shift the paradigm from the dominant, existing one (medical model) to a more nuanced, dimensional one. In order to conduct searches and interact with the data that has been collected within the medical-model paradigm, one needs to enter that system. It is acknowledged that this may feel at odds with a dimensional approach at times in the review, but the spirit remains one of engaging in order to extract data that may encourage the growth of an alternative approach.

The review will begin with an outline of the methods used to identify the data needed to answer the above question. It will then present the data on ER abilities comparative to other groups in Part 1, and in Part 2 a comparison of coping in people with bipolar and other groups. Finally, it will conclude with a discussion and interpretation of the data, as well as commentary on the quality of the data and possible future directions.

Method

Figure 1 shows the search strategy and results. Three databases were identified as potentially containing relevant publications for this review: PsychInfo, Medline, and PubMed. Medline and PsychInfo were searched simultaneously as they are curated by the same publisher. The following search terms were used on all databases: [bipolar OR cyclothymia] AND [emotion OR affect OR mood] AND [regulation OR dysregulation OR reactivity OR lability]. The search of PubMed took place on 11 December 2015 and returned 340 results when filtered to only include the following publication types: case reports, clinical trial, clinical trial phase I-IV, Comparative study, controlled clinical trial, evaluation studies, journal article, multi centre study, observational study, pragmatic clinical trial, randomised controlled trial, twin study, validation study, in humans, in English, in adults. The search of Medline and PsychInfo took place on 15 January 2016 and returned 602 results when the following filters were applied: peer reviewed articles published in English about adult humans. Filters were used on both searches due to the extremely large volume of results returned. While it is recognized that this is not ideal and some results may have been excluded in error due to the use of filters, pragmatically it was felt likely that any studies excluded from searches in error by filters would be identified through reference list review.

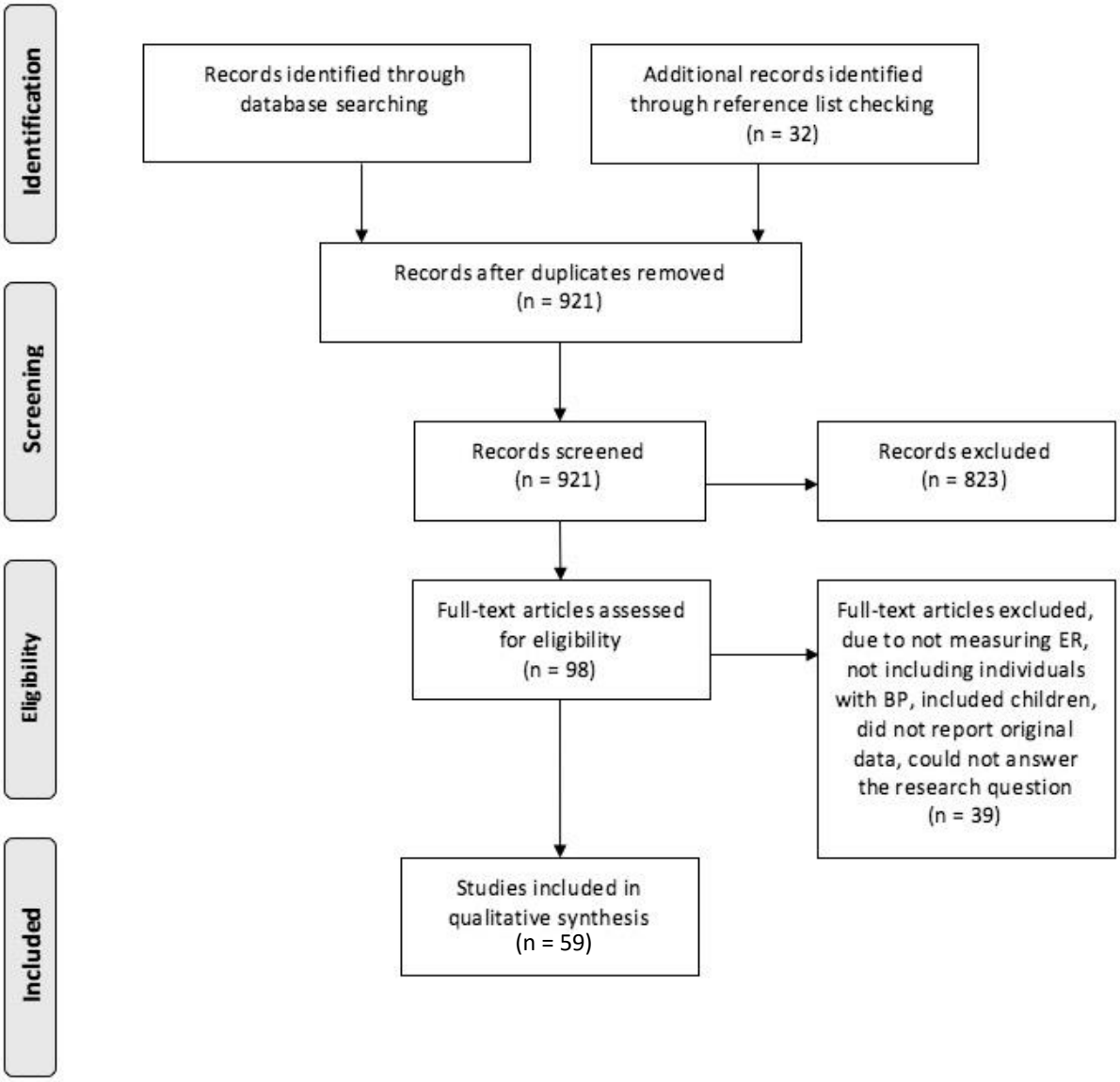

Figure 1. PRISMA flowchart showing the search strategy and outcome for the systematic review.

The abstracts for all results were screened for relevance to the review topic. Papers were excluded if they did not clearly measure (behaviourally or by self-report) some form of ER, were not original research, involved individuals under the age of 18 as participants, or did not include any individuals with a diagnosis of BP.

In total, the PubMed search yielded 36 relevant papers. The Medline/PsychInfo search identified a further 30 papers. Searching the references lists of these papers and relevant reviews identified through the search process yielded a further 32 studies, leaving 98 studies

to be reviewed in depth. Of these, 11 were excluded because they were found to not measure (or not clearly measure) ER. Four did not include individuals with BP, two included children, and two were theoretical papers that did not report original data. That left a final total of 79 studies that could possibly provide an answer to the review question. Of these, 59 were found to report data relevant to the question. Appendix 1 lists and describes these publications briefly.

These papers were read by the first author and relevant details needed for the completion of a quality framework were sourced to provide an objective standard of quality for the included studies. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al., 2007) (Appendix 2) were used for the all of the studies, including the single clinical trial reported as it was not a randomized controlled trial. The quality framework scores for each study are presented in Appendix 3.

Part 1: Emotional Regulation Abilities

1.1 Controls

Self-report questionnaires

By far the greatest number of studies into differences between ER ability and coping styles in people with BP compared them with healthy controls (HC). These studies varied greatly in their methodology. The majority used standardised self-report measures of ER such as the Affective Lability Scale (Harvey, Greenberg, & Serper, 1989) or the Difficulties in Emotional Regulation Scale (Gratz & Roemer, 2004) to compare those with BP to HC (Aas et al., 2014, 2015; Aminoff et al., 2012; Becerra et al., 2013; Henry et al., 2001a; Ives-Deliperi, Howells, Stein, Meintjes, & Horn, 2013; Johnson, Tharp, Peckham, & Mcmaster, 2016; Van Rheenen, Murray, & Rossell, 2015). Other more dimensional self-report measures that have been used are the MATHyS (Henry, M'Bailara, Mathieu, Poinsot, & Falissard,

2008) (one study – Atzeni et al., 2013) and the TEMPS-A (Hagop S. Akiskal, Akiskal, Haykal, Manning, & Connor, 2005) (two studies – Mahon, Perez-Rodriguez, Gunawardane, & Burdick, 2013; Mendlowicz, Jean-Louis, Kelsoe, & Akiskal, 2005). Instead of measuring ER, these measures focus more on emotional reactivity and/or cyclothymia (a state of on-going mood instability with multiple periods of depression and mild elation that is not sufficient to meet criteria for BP or unipolar depression (World Health Organisation, 2007)). Johnson and colleagues (2016) also combined data from several self-report measures into positive and negative ER factors.

Perhaps unsurprisingly, self-report measures of ER generally find significant differences between individuals with BP and HC, with BP individuals reporting greater difficulties with ER and mood changes. This is despite variability in study sample size and current participant mood state, although the evidence is strongest for euthymic individuals with BP. Type of BP does not appear to impact the results, but it is not yet clear from the literature whether there are differences between individuals with BP-I and BP-II in ER. The finding that euthymic individuals with BP have ER difficulties suggests that these difficulties are likely to persist into extreme affective episodes as well, but there are no studies which report on ER in the same individual in different mood states. There are also only limited data available on ER from individuals who are acutely unwell, but what is available suggests the difficulties are at least maintained when individuals are unwell, if not increased. However, this is an area where further research is required.

Emotion induction

Another type of self-report study is an experimental design that involves the induction of emotion experimentally and then asks participants to report on their responses, either in terms of the level of emotion experienced or success in regulating the emotion. These studies can involve external stimuli (Corbalán, Beaulieu, & Armony, 2015; Gruber, Harvey, & Gross,

2012; Lemaire, Aguillon-Hernandez, Bonnet-Brilhault, Martineau, & El-Hage, 2014) or internal stimuli, such as being asked to recall an autobiographical memory (Houshmand et al., 2010; Park et al., 2014). Study designs of this type vary considerably, as do their findings. In terms of external stimuli, individuals with BP may experience higher intensity of some emotions (sadness, anxiety, anger) in response to viewing emotionally arousing images (Lemaire et al., 2014) but this result was not found in a similar study (Corbalán et al., 2015). When video clips were viewed in a third study (Gruber et al., 2012), participants with BP reported exerting more effort to regulate their emotions than HC, and also less success. A study of positive internally generated emotion found no differences between BP and HC (Park et al., 2014), while a study of negative emotions found participants with BP-I reporting stronger negative emotions and greater difficulty regulating the emotion (Houshmand et al., 2010). As a whole, these emotion induction studies cannot offer a consistent finding regarding ER in BP but there are hints that negative emotions may be more difficult for individuals with BP to manage perhaps due to greater intensity of emotional experience.

Experimental manipulations of emotional state have also been tried, using either criticism (Cuellar, Johnson, & Ruggero, 2009; Das, Calhoun, & Malhi, 2014) or frustration (Edge, Lwi, & Johnson, 2014) to induce negative emotions. Frustrated participants did not differ in physiological or self-reported emotional reactivity based on group. Results from designs employing criticism are split – there is either no difference in self-reported reactivity between groups, or, if a difference is found, those with BP recover as quickly as HC. There is also a pair of studies that used manipulated feedback (to induce either happy or unhappy emotions) to test for differences in reaction between those with primarily BP-I (euthymic) and HC. One found that the BP group reported more reactivity in response to both praise and failure, and that those with BP reported more negatively valenced reactivity through the task in both failure and success conditions (Pavlova, Uher, Dennington, Wright, & Donaldson,

2011). When feedback was randomly assigned and a slightly different task utilised, no differences between BP and HC group were found on self-reported depression, anxiety, or hostility (the emotional variables examined) (Ruggero & Johnson, 2006).

As with self-report questionnaires, the results of these types of studies may not be surprising given that individuals with BP identify as having greater difficulty with ER and thus would be expected to report higher rates of ER difficulty when asked. Physiological measures to back up the self-report findings are inconsistent and not regularly used, sample sizes are small, there are many variables that are not consistently controlled for (such as type of emotion, current mood status, and influence of medication to name a few), and replication of studies is non-existent in this area, so any conclusions must be tentative given these methodological concerns. The most striking finding is that of absence. Given questionnaire self-report of greater difficulties with ER in BP compared to HC reported in the first section, it seems reasonable to predict that when emotion was induced that finding would be replicated, which it was not. As both methods (questionnaire and emotion induction) relied on self-report, it seems unlikely that the subjectivity of the data is to blame. Instead, it hints that perhaps there are factors in the lives of people with BP that are more challenging for them, which the induction tasks cannot adequately replicate.

Experimental induction

A type of study that could potentially get around the difficulties of self-report is an experiment designed to influence participants' emotional state and objectively measure the impact of this on performance. Studies using emotional distractors as a proxy for ER are the most common design. Studies in this category have generally been neuroimaging studies of performance on experimental tasks that contained an emotional distractor (Caseras et al., 2015; Deckersbach et al., 2008; Favre, Polosan, Pichat, Bougerol, & Baciu, 2015; Hummer et al., 2013; Kanske, Heissler, Schönfelder, Forneck, & Wessa, 2013). In three of five studies,

medicated euthymic BP participants (both BP-I and BP-II) performed more poorly when emotional distractors (both positive and negative) were present. A small study of symptomatically depressed and medicated BP-I participants (Deckersbach et al., 2008) may well have been underpowered to detect significant differences, with only nine participants. However, the largest imaging study, which included more than 70 unmedicated individuals with BP in various mood states (Hummer et al., 2013) found no significant difference between groups in terms of accuracy or reaction time. In fact, they found HC were slower than BP participants in all conditions, although not significantly so. Therefore, it is unclear what impact emotional distractors have on performance in BP and none of these studies has been replicated. The mixture of medicated and un-medicated participants with different types of BP further complicates interpretation in this area, and none of the studies used current symptom level as a covariate in statistical analysis of group differences. A final criticism is that it can be hard to make sense of how any findings in such artificial settings might translate to the real world, and this has not been tested adequately.

Naturalistic studies

In contrast to experimental studies, naturalistic studies are not difficult to make sense of in real-world terms. Two such studies have been conducted that are relevant to this review. The method used in both is experience sampling, where participants are prompted throughout a time period to record their emotional state and other details for the study. The first study, of patients with substance misuse (the majority of whom met criteria for a diagnosis of BP, any type) reported that on measures completed over a one-week period, patients showed more mood variability than HC for depressed, scared, and irritable moods, but not for high mood (Bowen, Block, & Baetz, 2008). However, they were primarily studying substance dependence and while the majority of their participants had BP, no separate analysis was reported separating this subgroup from the full substance dependent cohort. In another study

covering a six-day period, those with BP reported more ER effort than controls, as well as high emotionality for both positive and negative affect (Gruber, Kogan, Mennin, & Murray, 2013). However, the researchers did not separate their results out into specific emotions, and so their findings are not directly comparable to those of Bowen et al. (2008).

These studies both share the strength of a longitudinal, naturalistic design, but also share the shortcomings of being conducted over a very short period and with small groups of participants. However, they provide tentative evidence that outside of experimental manipulation, individuals with BP may experience subjectively more variation in their mood than controls, particularly for negative emotions. Again, however, this is perhaps not surprising as individuals with BP are self-reporting these experiences and we know that the nature of their diagnosis relates to shifts in mood over time above what is seen in the general population.

Summary

Evidence from both self-report and experimental studies generally suggests that individuals with BP experience more ER difficulties than HC. There is little differentiation in the literature between individuals with different subtypes of BP, however, and it is not clear how much of an impact these difficulties have on people with BP. Their reaction times and processing speeds may be slowed during times of emotional arousal, for example, and they may exert more effort to regulate their emotions, but the consequences of this are unclear. Further research is needed to understand the impact, if any, of positive emotional states on individuals with BP, particularly linked to the triggering of extreme and potentially harmful mood states such as mania. Replication studies using the methods and materials of the studies reported here are also needed, as the wide variety of approaches has made attaining a good understanding of ER processes in this population particularly difficult. Methods that do not rely on self-report would add significantly to the literature, as there is an inherent tautology in

the finding that individuals with a disorder based on changing mood states report their mood and emotions vary more than HC.

1.2 Unaffected relatives

Due to the strongly heritable nature of BP (McGuffin et al., 2003), it seems possible that the relatives of people with BP may experience some of the same difficulties as those with BP. Several studies, including a large study, have investigated this possibility, and results broadly suggest that unaffected relatives (UR) represent a mid-point between HC and BP groups when it comes to ER (Aas et al., 2015; Houshmand et al., 2010; Mahon, Perez-Rodriguez, Gunawardane, & Burdick, 2013; Mendlowicz, Jean-Louis, Kelsoe, & Akiskal, 2005). That is, UR are reporting significantly less ER difficulty than those with BP but more difficulty than HC. This seems to be the case for self-report of affective lability and emotion intensity, and also for self-report of cyclothymia. However, each of these studies differ in design and none has been replicated, so while the evidence is in agreement in terms of direction, it remains far from convincing.

It may be useful for future research to separate out different types of UR, as siblings will likely share more than genetics with the person with BP – familial environment and early experiences may well play a part in the development of ER, for example (Calkins & Hill, 2007; Stegge & Terwogt, 2007). Equally, genetics would not require both parents to have genes implicated in ER difficulties for those difficulties to be amplified in offspring, so if only one parent participates in research, this does not capture the full genetic story. The studies reported above all relied on a single relative.

1.3 Depression and Anxiety

Evidence comparing people with unipolar depression (UPD) or anxiety to those with BP on measures of ER is limited and mixed (Becerra et al., 2013; Gruber et al., 2013; Rihmer &

Benazzi, 2010; Rive et al., 2015). As is common in this subject area, the research has been conducted using a variety of instruments and study designs, making conclusions difficult to draw. Only one of the studies conducted has used a validated measure of ER (Becerra et al., 2013). Most of the research has focussed on whether behavioural or other ER difficulties are mood state-dependent, as well as determining whether they are unique markers of specific diagnoses. The results of these studies suggest that both UPD, anxiety, and BP groups report difficulty with ER, particularly when they are experiencing mood disturbance. The BP group continues to report greater difficulty than the other groups when participants are in remission. This is also supported by a large longitudinal study of conversion from UPD to BP that found a "mood lability" factor of personality traits predicted 86% of conversion (Akiskal et al., 1995).

Additionally, individuals with BP-II significantly more often endorse the statements "I have frequent ups and downs in mood, with and without apparent cause" and "My mood often changes from happiness to sadness, without my knowing why" than individuals with UPD (Benazzi, 2004a, 2004b; Benazzi & Akiskal, 2005). This gives weight to the finding that individuals with BP-II scored higher on a mood lability factor constructed from personality inventories than individuals with BP-I or UPD (Hagop S. Akiskal, Akiskal, et al., 2006). Those with BP-I and UPD had scores indicative of relative mood stability. BP-I formed a mid-point between BP-II and controls.

In summary, evidence for the specificity of ER difficulties of individuals with BP compared to those with UPD (and one study of anxiety) indicates that there may be a general deficit among clinically affected groups, but that self-reported "ups and downs" may be more specific to detecting BP. However, a wide range of measures have been used and little has been done to replicate results. It is unclear if there is any utility in considering ER difficulties as a differentiator between euthymic BP and UPD, based on the existing research. It may be

more useful to focus on the switch to mania in terms of studying ER, as mania is the unique feature of BP when compared to UPD and would have the most clinical utility.

1.4 Borderline Personality Disorder

There are several published reviews comparing BP and BPD on various factors, primarily because of noted parallels between ER difficulties in the two conditions. One of the questions raised is whether BP and BPD could usefully be considered as part of the same spectrum (Paris et al., 2007), particularly given the high co-morbidity rate between the two conditions. For example, a very large epidemiological study conducted in the US reported that rates of BP-I in individuals with BPD were 24%, and rates of BP-II were nearly 6% (Grant et al., 2008). The same study found rates of BPD in individuals with BP-I as high as 50%, and nearly 40% in individuals with BP-II. Additionally, another large study on the co-morbidity of BPD and BP found that BP individuals with higher mood instability and mood reactivity were more likely to also have a diagnosis of BPD (Perugi et al., 2013). These individuals had an earlier age of onset, higher risk of psychosis, significantly more suicide attempts, and resistance to pharmacological antidepressant treatment, among other features. Thus, it appears that the outcomes of those individuals with BP who have greater ER difficulties may well be significantly worse than for those with fewer ER difficulties, as perhaps one might expect. This is, therefore, an important area of study.

In their review, Paris and colleagues (2007) concluded that on the basis of available evidence, it is not useful to conceptualise the two conditions as related on a continuum, but they do highlight overlapping phenomenological features, including affective lability. Paris and colleagues also consider common aetiological factors, a finding echoed by Mackinnon and Pies (2006) in their review of rapid-cycling BP and BPD. Thus, there are hints of commonality between BPD and BP, but no comprehensive review has been conducted looking at ER in the two groups to date.

This literature search identified four studies that directly compared those with BPD to those with BP (without a comorbid BPD diagnosis) in terms of ER ability and cyclothymic traits. The results of self-report studies of ER comparing the populations generally supported the possibility that those with BPD are more susceptible to anger and those with BP-II to mania (Henry et al., 2001b; Reich, Zanarini, & Fitzmaurice, 2012). Additionally, those with BPD have been found to be more impulsive and have fewer ER strategies than individuals with BP-II (Fletcher, Parker, Bayes, Paterson, & McClure, 2014). When considering self-reports of temperament, no differences have been found between individuals with BPD and BP (Eich et al., 2014). Thus, it appears that, based on very limited evidence, individuals with BPD and BP-II have broadly similar levels of affective lability, but experience different problematic emotions and that those with BPD have more difficult employing strategies to regulate their emotions.

This literature is problematic in several ways. Firstly, the inclusion of only individuals with BP-II, rather than participants who had experienced full mania, makes it perhaps unsurprising that general differences in affective lability were not found. If mania is conceptualised as an extreme state of emotional dysregulation, and is the distinguishing feature of BP-I, the absence of participants with experience of it is significant. Indeed, the greater prevalence of the comorbidity of BP-I and BPD compared with BP-II and BPD suggests this is likely to be an important relationship to study. A common factor such as increased affective lability does seem to be a parsimonious explanation for the comorbidity in the two populations, at a phenomenological level, but there is only very limited evidence to support this position to date. Unfortunately, data available are from small samples and there is a lack of replication across studies.

1.5 Schizophrenia

Only one study has compared people with schizophrenia to those with BP in terms of ER abilities. A mixed group of BP-I and BP-II (all euthymic, some of whom had a history of psychosis) scored similarly to HC on the managing emotion subtest of the Mayer-Salovey-Caruso Emotional Intelligence Test (Mayer, 2002), and both of these groups performed significantly better than individuals with schizophrenia (Lee et al., 2013). Given the on-going debate about the relationship between BP and schizophrenia from genetic (Craddock & Owen, 2010) and diagnostic (Salvatore et al., 2009, 2011) perspectives, particularly when psychosis is present, this is clearly an important area for further research in order to adequately characterise similarities and differences.

1.6 Part 1 Summary

It seems clear from the papers reviewed here that individuals with BP do experience significantly greater ER difficulty than individuals without any history of mental health problems. This is based on both self-report and experimental studies, and draws on a mixture of well-validated and more novel research tools. However, it is not yet clear to what extent the ER difficulties experienced by people with BP are unique to BP as opposed to being a more general marker of mental disturbance, based on the lack of significant differences between people with BP and those with anxiety, UPD, or BPD. It is also unclear what differences exist, if any, which differentiate those with BP-I and BP-II from one another in terms of ER. The evidence comparing individuals with BP and co-morbid BPD hint that increased ER difficulty can negatively impact outcomes from people with BP, but this is a correlational finding with obvious potential confounds. The evidence comparing BP with schizophrenia on ER is so limited as to make it impossible to draw any reasonable conclusion, although there is a hint that those with schizophrenia are more impaired in terms of their ER than those with BP when all are in remission.

The research summarised suffers from a lack of replication, particularly where comparisons between clinical groups are concerned. The sample sizes are often small, and there is no coherent research programme that sets standards as to how ER should be compared across clinical groups most effectively. For example, the fact that not all studies control from current emotional symptoms, whether not or not participants are classified as "euthymic", is a serious concern as it seems clear that mood state has a direct effect on ER ability that must be disentangled from more broad, condition-specific effects, should any exist. It is also not clear to what extent self-report of ER difficulties is a good method for investigating these ideas, given the high likelihood of bias on the part of individuals who have a condition defined by their changes in mood. It is, however, the cheapest and easiest way we have currently available to conduct these studies. Future focus on better defining objective ways to measure ER difficulty would go a long way towards strengthening the quality of the evidence in this area.

Part 2: Coping Styles

Another way of considering ER is to focus on how people cope with their emotions. This can be measured by self-report (questionnaire), experimental design, or naturalistic study. Studies have been conducted comparing individuals with BP to HC, UR, UPD, BPD, schizophrenia, and insomnia, and are summarised below.

2.1 Controls

Self-report

A number of self-report measures of emotional coping exist, primarily the Cognitive Emotional Regulation Questionnaire (CERQ) (Garnefski & Kraaij, 2007), the Responses to Positive Affect (RPA) questionnaire (Feldman, Joormann, & Johnson, 2008), and the Response Styles Questionnaire (RSQ) (Nolen-Hoeksema, 1991). These have been used to

compare individuals with BP to HC and clinical populations, and the results are summarised below.

Five studies were identified that used the CERQ to compare coping of individuals with BP to HC (Fletcher, Parker, & Manicavasagar, 2013; Green et al., 2011; Rowland, Hamilton, Lino, et al., 2013; Rowland, Hamilton, Vella, et al., 2013; Wolkenstein, Zwick, Hautzinger, & Joormann, 2014). They generally found that individuals with euthymic BP more frequently report using rumination, catastrophizing, and self-blame. There is also evidence that individuals with BP reported less use of perspective-taking, positive reappraisal, planning, or positive refocussing than HC, with no differences between BP-I and BP-II.

Studies examining positive affect using the RPA generally find that individuals with BP are more likely to use dampening in response to positive affect than HC (Fletcher et al., 2013; Gruber, Eidelman, Johnson, Smith, & Harvey, 2011; Johnson et al., 2016). They also appear more likely to engage in self-focussed rumination when measured with the RPA (Gruber, Eidelman, et al., 2011) and Ruminative Response Scale (Treynor, Gonzalez, & Nolen-Hoeksema, 2003).

Fletcher et al. (2013), in same study reported above, found that those with BP of any type scored higher on risk taking and rumination on the RSQ, and lower on the adaptive subscale, than HC. Their study considered those with BP in a euthymic state, whereas two studies examined the responses of those with BP currently experiencing affective symptoms. Thomas and colleagues (2007) found that remitted patients ruminated more than the HC group or the manic group with BP. The manic BP group was significantly more likely to use active coping than the remitted or depressed BP groups, and they also scored higher on risk taking than the remitted group or HC. Van der Gucht et al. (2009) used a modified version of the RSQ, so the results are not directly comparable. However, in a similarly mixed group of

patients with BP, they found that those experiencing depression and mania used significantly more rumination than those in remission, but all BP groups used more rumination than HC. They replicated the increased risk taking in the manic BP group found in the previous two studies.

Finally, Gruber et al. (2008) utilised the Global Rumination Scale (McIntosh & Martin, 1992) in their study, as this scale explicitly focusses on ruminative responses to emotion. Compared to HC, those with euthymic BP-I had significantly higher rates of rumination. However, they found that controlling for current symptoms eliminated this difference. This was a small study, however, so it is possible that controlling for symptoms simply reduced the study's ability to detect significant differences due to being under-powered.

Naturalistic study

A single experience sampling study was conducted over a six-day period (Gruber et al., 2013). The study found that the BP group used more calming, distraction, and suppression than HC over this period. There was also a trend for using more appraisal. It is unclear whether this was because the BP was experiencing more emotional distress and thus needed to use more techniques, or whether they had access to more techniques. A strength of this study is its ecologically valid design. However, the sample size was small and it did not use standardised measures of ER efforts, instead using a study-specific measure with no reported validation data.

Experimental studies

An experimental study of emotion induction found that after being shown a range of film clips (positive, neutral, and negative), the BP-I group reported greater increases in positive affect than HC (Gruber, Harvey, & Purcell, 2011). However, they also recovered

physiologically, returning to a physiologically neutral state, just as quickly as controls. A different report of the same study found that those with BP-I were able to successfully use reappraisal to reduce both subjective and physiological responses to positive affect, and subjective responses to negative affect (Gruber, Hay, & Gross, 2014), similar to HC. Although these studies reported results from a small sample, the experimental design was robust and the findings are promising.

The review identified a single study (Gul & Khan, 2014) that used the Emotional Regulation Questionnaire (ERQ) (Gross & John, 2003). The ERQ measures how individuals regulate their emotions, and Gul and Khan (2014) used it to test for differences during an experimental ER task. The authors found that euthymic BP-I participants reported using less cognitive reappraisal and more emotional suppression than HC during the task.

Finally, one study sought to teach individuals with BP-I (remitted) and HC strategies for ER (Hay, Sheppes, Gross, & Gruber, 2015). Participants were taught to use either distraction or reappraisal, and were then shown emotionally stimulating images (both positive and negative) and asked to regulate their emotional responses. The data show that there were no differences in ability to utilise these strategies between BP and HC groups, regardless of technique or type of emotion experienced. This study was small, but its unique design adds considerably to the understanding of the more context-free questionnaire data reported in other studies.

Summary

The evidence from the data available on coping strategy choice and usage indicates that people with BP-I have significantly limited ER strategies available to them compared with HC. The strongest evidence is for use of rumination and self-criticism, but there is also limited evidence that dampening and reappraisal can be used by people with BP to help

manage positive affect. Several studies also indicate that individuals with BP-II may also have limited ER strategies, but there is less evidence for this. Deficits in emotion regulation strategies may be pronounced when individuals are experiencing acute mood symptoms, but there is only limited evidence to support this conclusion. It is also unknown which more adaptive ER strategies might be helpful for individuals with BP experiencing low mood, as to date only less adaptive strategies such as rumination have been reported. This has important implications for any psychological interventions targeted at helping individuals with BP, particularly those in the cognitive behavioural tradition.

2.2 Relatives

Only one study comparing coping styles used by those with BP and UR was identified (Green et al., 2011). It used the CERQ to compare UR, HC, and BP-I (euthymic), and found the same pattern of deficits when BP were compared with UR as when they were compared to HC – higher use of rumination, catastrophizing, and self-blame. BP participants also used less putting into perspective than UR. However, URs used significantly more self-blame and rumination than HC, representing a mid-point between HC and BP similar to the self-reported ER data from URs reported in part 1.

2.3 Depression

Self-report

Several studies have compared self-report data of individuals with BP to UPD. In a large study, Fletcher and colleagues (2013) found that, when measured with RPA and CERQ, those with BP-I and -II were more likely to engage in emotion-focussed and self-focussed rumination as a coping strategy for dealing with positive affect, compared with those with UPD. In terms of negative affect, the BP groups were more likely to engage in risk-taking coping strategies than UPD. BP-II patients scored higher on emotion-focussed responses to

positive affect than UPD patients when RPA was used rather than CERQ. No differences were found in risk-taking using the RPA. Interestingly, however, in a similar study, Wolkenstein et al. (2014) asked a medium-sized mixed group of BP patients, all in remission, and a group with remitted UPD, to complete the CERQ. They found no significant difference between the groups.

In a different design, Johnson et al. (2016) reported on a small mixed group (BP-I, II, and NOS) of undergraduate university students screened for BP. Participants completed a range of measures, and ER factors were created from the measures: negative emotion, reappraisal, suppression, and positive emotion. Compared to those with a history of UPD or HC, they found that those with BP selected strategies that involved focus on positive emotions more than the other groups. This effect disappeared when current manic symptoms were controlled for however. BP participants were also more likely to endorse more negative rumination, but again this effect also disappeared when results of a depression scale were controlled for. This study could be criticised for using individuals who are likely to have less strong symptoms of BP, given they were not diagnosed prior to involvement in the study, and so the generalisability of the results is questionable.

Experimental studies

Two small studies have experimentally manipulated mood in groups with UPD and BP. One study instructed participants with BP-I and UPD (both remitted) to visualise a goal, and then complete the RPA (Gilbert, Nolen-Hoeksema, & Gruber, 2013). No differences were found at a global level between the groups, but there were subtle physiological changes associated with response strategy, and there was an association between dampening and higher manic and depressive symptoms in the BP group. A later study by the same research group, again using individuals with BP-I and UPD replicated the general lack of finding of significant differences on a goal visualisation paradigm (Gilbert & Gruber, 2014), but did not use the

RPA. Instead, it used self-report of positive and negative affect, as well as physiological measures.

Naturalistic studies

An experience sampling paradigm conducted by Gruber and colleagues (2013) found that both BP and UPD groups reported more ER effort compared to HC, using calming, distraction, and suppression. There was also a trend towards BP participants using more appraisal. BP groups also reported high positive and negative emotionality (matching HC and UPD groups respectively) across days. While the study utilised a unique naturalistic design, it only recorded data over six days and only had small sample sizes.

Summary

Overall, a range of different methods have been used to compare those with UPD to those with BP in terms of coping with emotions. The results have been mixed. The strongest evidence comes from experimental studies of the effect of mood induction on people with BP-I – they do not appear to be more affected by inducted mood than those with UPD. Other findings regarding coping style difference between those with BP and UPD have been mixed, and no clear conclusions can be drawn from the evidence at this time. Those with BP may be more prone to risk-taking and they may also focus more on positive affect, but as shown by Johnson and colleagues (2016), current mood state can affect these findings and should be controlled for. Theirs is the only study to control for current mood, and they found no significant differences.

2.5 BPD

Only two studies have been conducted in this area. First, a small study found that people with BPD scored lower than those with BP-II on the CERQ scales of Planning, Positive Reappraisal, and Perspective, but higher on Self-Blame, Catastrophize, and Blame scales

(Fletcher et al., 2014). This, combined with the results on ER difficulties and impulsivity in people with BPD from the same study, suggest that ER difficulties and a lack of positive coping styles may help explain the poorer outcomes for individuals with BPD compared to those with BP.

The second study involved transcripts of a 50-minute dynamic interview rated by observers (Kramer, 2012). It found that compared with outpatients with BPD, patients with acute BP (inpatients) used more negotiation and accommodation. There were no other differences in how the two groups coped reported in this study.

Thus, while it appears there may be some differences in how people with BPD and BP cope with emotions, there is only very limited evidence and further research is needed in this area.

2.6 Schizophrenia

In a pair of studies conducted recently, Rowland and colleagues found differences in the pattern of responses to emotion between individuals with BP and schizophrenia. In the first, a large study, those with BP-I reported the highest levels of rumination and self-blame, and those with BP and schizophrenia had similar levels of catastrophizing and low levels of putting into perspective, compared with controls (Rowland, Hamilton, Vella, et al., 2013). There were significant group differences in depression and anxiety/stress, which the researchers attempted to control for with statistical analysis. A separate medium-sized study found higher levels of self-blame in a BP group compared to a group with schizophrenia, with schizophrenia forming a mid-way point between BP and HC (Rowland, Hamilton, Lino, et al., 2013). Again, there were significant differences in the symptoms reported by patients in this study, but in this study no attempts were made to control for the impact of this on the variables of interest using statistical techniques.

Although these studies are well-designed in that they use standardised measures and reasonably large sample sizes, they have not been replicated. The lack of well-matched samples on emotional variables, while understandable, also raises concerns over the validity of the results as emotional state has been shown to impact on reported ER in other studies reviewed here.

2.7 Insomnia

In a small study of individuals with BP and individuals with insomnia, Gruber and colleagues found that if current symptoms were not included in the analysis, those with insomnia had similar levels of rumination and worry as those with BP (Gruber et al., 2008). However, these differences vanished when current symptoms were controlled for, suggesting they are state-linked rather than trait-linked. This study provides a further warning that studies of self-reported ER need to control for current mood state as this is a potential confounding factor.

2.8 Part 2 Summary

People with BP appear to cope less effectively with their emotions than HC. As in self-report of ER, UR appear to form a mid-point between HC and BP groups, but there is only limited evidence to support this. Mood state appears to be key to predicting coping across clinical populations, however, and the research has been mixed in the extent to which studies control for mood state. This, as well as the variety of methods used and the general lack of replication studies, may explain the mixed results across comparisons with other clinical groups. Most studies in this area are small and while they are generally well-designed, are likely to have limited power to detect true differences between groups. Of all clinical groups reported in this section, however, it appears that those with BPD are consistently less able to cope effectively with emotions than those with BP – a finding that supports the results of the self-report studies reported in Part 1.

Quality of the evidence

Concerns have been raised regarding the quality of the evidence reported in observational studies, and about the quality of the reporting itself. An initiative was established in 2004 to develop guidelines to help improve the quality of reporting in this area (von Elm et al., 2007), called STROBE. The resulting STROBE Checklist has subsequently been used by leading academic journals to help improve the reporting of observational research. The STROBE Checklist was utilised in this review to evaluate the quality of the reporting of the studies reviewed (Appendix 3).

The quality of the reporting was variable, ranging from 13 to 22. A higher score reflects more robust reporting, but slight variations in study design make it hard to directly compare overall scores as the maximum possible score is variable. The median score was 17, and the mean was 17.5.

Areas of particular weakness in the reporting of evidence were:

- lack of description of the research setting, particularly dates over which the research was conducted
- lack of attempts to address potential sources of bias in the research, particularly in recruitment
- lack of justification of sample sizes or power analyses
- lack of reporting on participants through the course of the study – e.g. how many were initially contacted or approached the study, of these how many were eligible to participate, etc.
- little discussion of missing data and how this was handled in analyses

Some of these weaknesses are perhaps more concerning than others. While the difficulties of recruiting well-defined clinical groups make it understandable that samples may be small and

probably not representative, little is done in the evidence base to comment on this or try to correct for it. This includes in the discussion of the generalisability of the findings. It is also difficult to draw accurate conclusions about the robustness of the evidence when power calculations and/or effect sizes are not often reported, and the lack of commentary on missing data across most studies in this review is concerning.

Therefore, it is considered that the quality of reporting of the evidence in this review is fair. Many of the basic principles described in STROBE are met, including a generally robust statement of aims and hypotheses of research, good diagnostic descriptions, use of validated and reliable measures, and measured discussion of the results.

Implications for Clinical Practice

It may be useful to consider the implications of the research summarised in this review on clinical practice. For clinical psychologists, particularly, the understanding that people with a diagnosis of BP report ER difficulties at a similar level to those reported by people with BPD provides both treatment targets and the possibility for prevention. These ideas will be discussed separately below.

In terms of treatment options, there is growing evidence that treatments including mindfulness practice may be useful in helping individuals with ER difficulties (Hill & Updegraff, 2012). Given the clinical similarities in ER between BP and BPD summarised above, an obvious existing therapy model that shows promise is dialectical behavioural therapy (DBT) (Linehan, Armstrong, Suarez, Allmon, & Heard, 1991). DBT has been adapted and used in a randomised controlled treatment trial of people with BP with promising results (Van Dijk, Jeffrey, & Katz, 2013). Similarly, mindfulness based cognitive therapy (MBCT) has also been used with people with BP and been found to increase ER abilities (Deckersbach et al., 2012). Other therapeutic models, such as Acceptance and Commitment

Therapy (ACT) provide an alternative approach to problematic ER that incorporates elements of mindfulness and has been shown promise in the treatment of individuals with emotional difficulties following psychosis, including individuals with BP (White et al., 2011). ACT has also been used with people with BP who have co-morbid anxiety with promising results (Pankowski, Adler, Andersson, Lindefors, & Svanborg, 2017). Thus, it appears that the general premise that ER difficulties in people with BP represent a treatment target for psychological therapy that can improve the well-being and reduce symptoms in this population appears promising. In particular, given the evidence reviewed, it appears that a focus on the management of emotions related to mania may be the most useful for individuals with BP – a treatment protocol focussing on managing irritable and euphoric feelings should be developed and tested.

It may be worth considering separately the utility of conceptualising ER difficulty as a potentially pathological factor when dealing with at-risk groups. For example, mindfulness and specific ER skills, including general education around emotional well-being, could be taught in schools. A potential model for this is CBT skills taught in a classroom-based style to adolescents at risk for depression, which showed success (Stallard et al., 2012). Mindfulness programmes have already been piloted in schools with promising results (Kuyken et al., 2013), and so extending and building on this evidence provides an obvious direction of development of this idea. Increasing the resilience and ER abilities of young people before the first onset of serious mental illness seems likely to be effective in reducing overall rates of distress and duration of illness, although this has not been studied longitudinally to date. This is an exciting direction that can only be expanded as evidence increases both our understanding of ER in BP and also our understanding of the effects of psychological treatments on ER and well-being.

Conclusions

A wide variety of research has been conducted investigating ER in people with BP. Overall, this research is reported to a fair standard, but there is scope for improvement. The studies to date have often used creative methods to tease out sometimes subtle differences between groups. The picture that emerges is that those with BP most likely do experience deficits in regulating and coping with their emotions, which they are able to self-report. However, it remains unclear to what extent, if any, those deficits are above and beyond what is seen in clinical populations more general. There are hints at particular areas of difficulty, e.g. that those with BP struggle particularly with regulating their emotional "highs" whereas all clinical groups may struggle to regulate low mood. This is a rich area of study that would benefit from larger participant numbers, better reporting including in particular more care and attention to statistical analysis of power or effect, and more consistent methods, as the creative and varied studies to date make drawing firm conclusions difficult. Until agreed methodology is used across research groups, it is likely to continue to be a mixed area of research findings. The results provide promising targets for prevention and intervention in BP and other mental health problems, and should be studied in this context in greater detail.

References

Aas, M., Aminoff, S. R., Vik Lagerberg, T., Etain, B., Agartz, I., Andreassen, O. a, & Melle, I. (2014). Affective lability in patients with bipolar disorders is associated with high levels of childhood trauma. *Psychiatry Research*, *218*(1–2), 252–5. http://doi.org/10.1016/j.psychres.2014.03.046

Aas, M., Pedersen, G., Henry, C., Bjella, T., Bellivier, F., Leboyer, M., … Etain, B. (2015). Psychometric properties of the Affective Lability Scale (54 and 18-item version) in patients with bipolar disorder, first-degree relatives, and healthy controls. *Journal of Affective Disorders*, *172*, 375–380. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25451440

Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005). TEMPS-A: progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire. *Journal of Affective Disorders*, *85*(1–2), 3–16. http://doi.org/10.1016/j.jad.2004.12.001

Akiskal, H. S., Akiskal, K. K., Perugi, G., Toni, C., Ruffolo, G., & Tusini, G. (2006). Bipolar II and anxious reactive "comorbidity": Toward better phenotypic characterization suitable for genotyping. *Journal of Affective Disorders*, *96*(3), 239–247. http://doi.org/10.1016/j.jad.2006.08.010

Akiskal, H. S., Kilzieh, N., Maser, J. D., Clayton, P. J., Schettler, P. J., Traci Shea, M., … Keller, M. B. (2006). The distinct temperament profiles of bipolar I, bipolar II and unipolar patients. *Journal of Affective Disorders*, *92*(1), 19–33. http://doi.org/10.1016/j.jad.2005.12.033

Akiskal, H. S., Maser, J. D., Zeller, P. J., Endicott, J., Coryell, W., Keller, M., … Goodwin, F. (1995). Switching from "unipolar" to bipolar II. An 11-year prospective study of clinical and temperamental predictors in 559 patients. *Archives of General Psychiatry*, *52*(2), 114–23. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7848047

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237. http://doi.org/10.1016/j.cpr.2009.11.004

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, Virginia: American Psychiatric Publishing.

Aminoff, S. R., Jensen, J., Lagerberg, T. V., Hellvin, T., Sundet, K., Andreassen, O. A., & Melle, I. (2012). An association between affective lability and executive functioning in bipolar disorder. *Psychiatry Research*, *198*(1), 58–61. http://doi.org/10.1016/j.psychres.2011.12.044

Atzeni, T., Henry, C., Minois, I., Gard, S., Desage, A., Zanouy, L., & M'Bailara, K. (2013). From inhibition to activation, from emotional hyporeactivity to emotional hyperreactivity: Two pathways to discriminate mood in bipolar disorders. *Psychiatry Research*, *209*(1), 50–54. http://doi.org/10.1016/j.psychres.2012.10.008

Barneveld, P. S., Pieterse, J., de Sonneville, L., van Rijn, S., Lahuis, B., van Engeland, H., & Swaab, H. (2011). Overlap of autistic and schizotypal traits in adolescents with Autism Spectrum Disorders. *Schizophrenia Research*, *126*(1–3), 231–236. http://doi.org/10.1016/j.schres.2010.09.004

Baron-Cohen, S. (2002). The extreme male brain theory of autism. *TRENDS in Cognitive Sciences*, *6*(6), 248–254.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/High-Functioning Autism, Malesand Females, Scientists and Mathematicians. *Journal of Autism and*

Developmental Disorders, *31*(1), 5–17. http://doi.org/10.1023/a:1005653411471
Becerra, R., Cruise, K., Murray, G., Bassett, D., Harms, C., Allan, A., & Hood, S. (2013). Emotion regulation in bipolar disorder : Are emotion regulation abilities less compromised in euthymic bipolar disorder than unipolar depressive or anxiety disorders ? *Open Journal of Psychiatry*, *3*(4a), 1–7.
Benazzi, F. (2004a). Inter-episode mood lability in mood disorders: Residual symptom or natural course of illness? *Psychiatry and Clinical Neurosciences*, *58*, 480–486. http://doi.org/10.1111/j.1440-1819.2004.01289.x
Benazzi, F. (2004b). Validating Angst's "ups & downs" personality trait as a new marker of bipolar II disorder. *European Archives of Psychiatry and Clinical Neuroscience*, *254*(1), 48–54. http://doi.org/10.1007/s00406-004-0455-8
Benazzi, F., & Akiskal, H. S. (2005). A downscaled practical measure of mood lability as a screening tool for bipolar II. *Journal of Affective Disorders*, *84*(2–3), 225–32. http://doi.org/10.1016/j.jad.2003.09.010
Bowen, R., Block, G., & Baetz, M. (2008). Mood and Attention Variability in Women with Alcohol Dependence: A Preliminary Investigation. *American Journal on Addictions*, *17*(1), 77–81. http://doi.org/10.1080/10550490701756013
Brosnan, M., Ashwin, C., & Gamble, T. (2013). Greater Empathizing and reduced Systemizing in people who show a jumping to conclusions bias in the general population: Implications for psychosis. *Psychosis*, *5*(1), 71–81.
Brosnan, M., Ashwin, C., Walker, I., & Donaghue, J. (2010). Can an "Extreme Female Brain" be characterised in terms of psychosis? *Personality and Individual Differences*, *49*, 738–742.
Brown, T. a, & Barlow, D. H. (2005). Dimensional versus categorical classification of mental disorders in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders and beyond: comment on the special section. *Journal of Abnormal Psychology*, *114*(4), 551–556. http://doi.org/10.1037/0021-843X.114.4.551
Burbach, J. P. H., & van der Zwaag, B. (2009). Contact in the genetics of autism and schizophrenia. *Trends in Neurosciences*, *32*(2), 69–72.
Calkins, S. D., & Hill, A. (2007). Caregiver influences on emerging emotion regulation: Biological and environmental transactions in early development. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 229–248). London: Guilford Press.
Callaway, D. A., Cohen, A. S., Matthews, R. A., & Dinzeo, T. J. (2014). Schizotypal Personality Questionnaire-Brief Revised: psychometric replication and extension. *Personality Disorders*, *5*(1), 32–8. http://doi.org/10.1037/per0000041
Caseras, X., Murphy, K., Lawrence, N. S., Fuentes-Claramonte, P., Watts, J., Jones, D. K., & Phillips, M. L. (2015). Emotion regulation deficits in euthymic bipolar I versus bipolar II disorder: a functional and diffusion-tensor imaging study. *Bipolar Disorders*, (3), 1–10. http://doi.org/10.1111/bdi.12292
Castle, D. J., Jablensky, A., McGrath, J. J., Carr, V., Morgan, V., Waterreus, A., … Farmer, A. (2006). The diagnostic interview for psychoses (DIP): development, reliability and applications. *Psychological Medicine*, *36*, 69–80.
Cederlund, M., Hagberg, B., Billsted, E., Gillberg, I. C., & Gillberg, C. (2008). Asperger syndrome and autism: a comparative longitudinal follow-up study more than 5 years after original diagnosis. *Journal of Autism and Developmental Disorders*, *38*, 72–85.
Chisholm, K., Lin, A., Abu-Akel, A., & Wood, S. J. (2015). The association between autism and schizophrenia spectrum disorders: A review of eight alternate models of co-occurrence. *Neuroscience and Biobehavioral Reviews*, *55*, 173–183. http://doi.org/10.1016/j.neubiorev.2015.04.012
Cohen, A. S., Matthews, R. a, Najolia, G. M., & Brown, L. a. (2010). Toward a more

psychometrically sound brief measure of schizotypal traits: introducing the SPQ-Brief Revised. *Journal of Personality Disorders*, *24*(4), 516–537. http://doi.org/10.1521/pedi.2010.24.4.516

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cooper, S.-A., Smiley, E., Morrison, J., Williamson, A., & Allan, L. (2006). Mental ill-health in adults with intellectual disabilities: prevalence and associated factors. *The British Journal of Psychiatry*, *190*(1), 27–35.

Corbalán, F., Beaulieu, S., & Armony, J. L. (2015). Emotion regulation in bipolar disorder type I: an fMRI study. *Psychological Medicine*, 1–11. http://doi.org/10.1017/S0033291715000434

Coulston, C. M., Tanious, M., Mulder, R. T., Porter, R. J., & Malhi, G. S. (2012). Bordering on bipolar: the overlap between borderline personality and bipolarity. *The Australian and New Zealand Journal of Psychiatry*, *46*(6), 506–21. http://doi.org/10.1177/0004867412445528

Couture, S. M., Penn, D. L., Losh, M., Adolphs, R., Hurley, R., & Piven, J. (2010). Comparison of social cognitive functioning in schizophrenia and high functioning autism: more convergence than divergence. *Psychological Medicine*, *40*(4), 569–579. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827676/

Craddock, N., & Owen, M. J. (2010). The Kraepelinian dichotomy - going, going... but still not gone. *Br J Psychiatry*, *196*(2), 92–95. http://doi.org/196/2/92 [pii]10.1192/bjp.bp.109.073429

Crespi, B., & Badcock, C. (2008). Psychosis and autism as diametrical disorders of the social brain. *Behavioral and Brain Sciences*, *31*, 241–261.

Cuellar, A. K., Johnson, S. L., & Ruggero, C. J. (2009). Affective reactivity in response to criticism in remitted bipolar disorder: a laboratory analog of Expressed Emotion. *Journal of Clinical Psychology*, *65*(9), 925–41. http://doi.org/10.1002/jclp.20596

Dakin, S., & Frith, U. (2005). Vagaries of visual perception in autism. *Neuron*, *48*(3), 497–507. http://doi.org/10.1016/j.neuron.2005.10.018

Das, P., Calhoun, V., & Malhi, G. S. (2014). Bipolar and borderline patients display differential patterns of functional connectivity among resting state networks. *NeuroImage*, *98*, 73–81. http://doi.org/10.1016/j.neuroimage.2014.04.062

Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A., & Liaw, J. (2004). Early social attention impairments in autism: social orienting, joint attention, and attention to distress. *Developmental Psychology*, *40*(2), 271–283. http://doi.org/10.1037/0012-1649.40.2.271

de Lacy, N., & King, B. H. (2013). Revisiting the Relationship Between Autism and Schizophrenia: Toward an Integrated Neurobiology. *Annual Review of Clinical Psychology*, *9*, 555–587.

Deckersbach, T., Hölzel, B. K., Eisner, L. R., Stange, J. P., Peckham, A. D., Dougherty, D. D., … Nierenberg, A. a. (2012). Mindfulness-based cognitive therapy for nonremitted patients with bipolar disorder. *CNS Neuroscience & Therapeutics*, *18*(2), 133–41. http://doi.org/10.1111/j.1755-5949.2011.00236.x

Deckersbach, T., Sl, R., Buhlmann, U., Ostacher, M., Beucke, J.-C., Nierenberg, A., … Dougherty, D. (2008). An fMRI investigation of working memory and sadness in females with bipolar disorder : a brief report. *Bipolar DIsorders*, *10*(20), 928–942. http://doi.org/10.1111/j.1399-5618.2008.00633.x

Dickstein, D. P., & Leibenluft, E. (2006). Emotion regulation in children and adolescents: boundaries between normalcy and bipolar disorder. *Development and Psychopathology*, *18*(4), 1105–31. http://doi.org/10.1017/S0954579406060536

Dinsdale, N. L., Hurd, P. L., Wakabayashi, A., Elliot, M., & Crespi, B. J. (2013). How are autism and schizotypy related? Evidence from a non-clinical population. *PloS One*, *8*(5), e63316. http://doi.org/10.1371/journal.pone.0063316

Edge, M. D., Lwi, S. J., & Johnson, S. L. (2014). An Assessment of Emotional Reactivity to Frustration of Goal Pursuit in Euthymic Bipolar I Disorder. *Clinical Psychological Science*, *3*(6), 940–955. http://doi.org/10.1177/2167702614555412

Eich, D., Gamma, A., Malti, T., Vogt Wehrli, M., Liebrenz, M., Seifritz, E., & Modestin, J. (2014). Temperamental differences between bipolar disorder, borderline personality disorder, and attention deficit/hyperactivity disorder: Some implications for their diagnostic validity. *Journal of Affective Disorders*, *169*, 101–104. http://doi.org/10.1016/j.jad.2014.05.028

Esterberg, M. L., Ousley, O. Y., Cubells, J. F., & Walker, E. F. (2013). Prodromal and autistic symptoms in schizotypal personality disorder and 22q11.2 deletion syndrome. *Journal of Abnormal Psychology*, *122*(1), 238–49. http://doi.org/10.1037/a0028373

Esterberg, M. L., Trotman, H. D., Brasfield, J. L., Compton, M. T., & Walker, E. F. (2008). Childhood and current autistic features in adolescents with schizotypal personality disorder. *Schizophrenia Research*, *104*(1–3), 265–73. http://doi.org/10.1016/j.schres.2008.04.029

Favre, P., Polosan, M., Pichat, C., Bougerol, T., & Baciu, M. (2015). Cerebral Correlates of Abnormal Emotion Conflict Processing in Euthymic Bipolar Patients: A Functional MRI Study. *PLoS One*, *10*(8), e0134961. http://doi.org/10.1371/journal.pone.0134961

Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to Positive Affect: A Self-Report Measure of Rumination and Dampening. *Cognitive Therapy and Research*, *32*(4), 507–525. http://doi.org/10.1007/s10608-006-9083-0

Fletcher, K., Parker, G. B., & Manicavasagar, V. (2013). Coping profiles in bipolar disorder. *Comprehensive Psychiatry*, *54*(8), 1177–84. http://doi.org/10.1016/j.comppsych.2013.05.011

Fletcher, K., Parker, G., Bayes, A., Paterson, A., & McClure, G. (2014). Emotion regulation strategies in bipolar II disorder and borderline personality disorder: differences and relationships with perceived parental style. *Journal of Affective Disorders*, *157*, 52–9. http://doi.org/10.1016/j.jad.2014.01.001

Ford, T. C., & Crewther, D. P. (2014). Factor Analysis Demonstrates a Common Schizoidal Phenotype within Autistic and Schizotypal Tendency: Implications for Neuroscientific Studies. *Frontiers in Psychiatry*, *5*(August), 117. http://doi.org/10.3389/fpsyt.2014.00117

Garnefski, N., & Kraaij, V. (2007). The Cognitive Emotion Regulation Questionnaire. *European Journal of Psychological Assessment*, *23*(3), 141–149. http://doi.org/10.1027/1015-5759.23.3.141

Geschwind, D. H., & Levitt, P. (2007). Autism spectrum disorders: developmental disconnection syndromes. *Current Opinion in Neurobiology*, *17*(1), 103–111.

Ghaznavi, S., & Deckersbach, T. (2012). Rumination in bipolar disorder: evidence for an unquiet mind. *Biology of Mood & Anxiety Disorders*, *2*(1), 2. http://doi.org/10.1186/2045-5380-2-2

Gilbert, K. E., Nolen-Hoeksema, S., & Gruber, J. (2013). Positive emotion dysregulation across mood disorders: how amplifying versus dampening predicts emotional reactivity and illness course. *Behaviour Research and Therapy*, *51*(11), 736–41. http://doi.org/10.1016/j.brat.2013.08.004

Gilbert, K., & Gruber, J. (2014). Emotion Regulation of Goals in Bipolar Disorder and Major Depression: A Comparison of Rumination and Mindfulness. *Cognitive Therapy and Research*, *38*(4), 375–388. http://doi.org/10.1007/s10608-014-9602-3

Grande, I., Berk, M., Birmaher, B., & Vieta, E. (2016). Bipolar disorder. *The Lancet*, *387*(10027), 1561–1572. http://doi.org/10.1016/S0140-6736(15)00241-X

Grant, B. F., Chou, S. P., Goldstein, R. B., Huang, B., Stinson, F. S., Saha, T. D., … Ruan, W. J. (2008). Prevalence, correlates, disability, and comorbidity of DSM-IV borderline personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *The Journal of Clinical Psychiatry*, *69*(4), 533–45. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18426259

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41–54. http://doi.org/10.1023/B:JOBA.0000007455.08539.94

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person × situation perspective. *Journal of Personality and Social Psychology*, *93*(4), 583–599. http://doi.org/10.1037/0022-3514.93.4.583

Green, M. J., Cahill, C. M., & Malhi, G. S. (2007). The cognitive and neurophysiological basis of emotion dysregulation in bipolar disorder. *Journal of Affective Disorders*, *103*(1–3), 29–42. http://doi.org/10.1016/j.jad.2007.01.024

Green, M. J., Lino, B. J., Hwang, E.-J., Sparks, A., James, C., & Mitchell, P. B. (2011). Cognitive regulation of emotion in bipolar I disorder and unaffected biological relatives. *Acta Psychiatrica Scandinavica*, *124*(4), 307–16. http://doi.org/10.1111/j.1600-0447.2011.01718.x

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*(2), 348–362. http://doi.org/10.1037/0022-3514.85.2.348

Gruber, J., Eidelman, P., & Harvey, A. G. (2008). Transdiagnostic emotion regulation processes in bipolar disorder and insomnia. *Behaviour Research and Therapy*, *46*(9), 1096–100. http://doi.org/10.1016/j.brat.2008.05.004

Gruber, J., Eidelman, P., Johnson, S. L., Smith, B., & Harvey, A. G. (2011). Hooked on a feeling: Rumination about positive and negative emotion in inter-episode bipolar disorder. *Journal of Abnormal Psychology*, *120*(4), 956–961.

Gruber, J., Harvey, A. G., & Gross, J. J. (2012). When trying is not enough: emotion regulation and the effort-success gap in bipolar disorder. *Emotion (Washington, D.C.)*, *12*(5), 997–1003. http://doi.org/10.1037/a0026822

Gruber, J., Harvey, A. G., & Purcell, A. (2011). What goes up can come down? A preliminary investigation of emotion reactivity and emotion recovery in bipolar disorder. *Journal of Affective Disorders*, *133*(3), 457–66. http://doi.org/10.1016/j.jad.2011.05.009

Gruber, J., Hay, A. C., & Gross, J. J. (2014). Rethinking emotion: cognitive reappraisal is an effective positive and negative emotion regulation strategy in bipolar disorder. *Emotion (Washington, D.C.)*, *14*(2), 388–96. http://doi.org/10.1037/a0035249

Gruber, J., Kogan, A., Mennin, D., & Murray, G. (2013). Real-world emotion? An experience-sampling approach to emotion experience and regulation in bipolar I disorder. *Journal of Abnormal Psychology*, *122*(4), 971–83. http://doi.org/10.1037/a0034425

Gul, A., & Khan, K. (2014). Emotion regulation strategies can predict task-switching abilities in euthymic bipolar patients. *Frontiers in Human Neuroscience*, *8*(October), 847. http://doi.org/10.3389/fnhum.2014.00847

Hartmann, K., Urbano, M., Manser, K., & Okwara, L. (2012). Modified Dialectical Behavior Therapy to Improve Emotion Regulation in Autism Spectrum Disorders. In C. E. Richardson & R. A. Wood (Eds.), *Autism Spectrum Disorders* (pp. 41–72). Hauppauge, New York: Nova Science Publishers, Inc.

Harvey, P. D., Greenberg, B. R., & Serper, M. R. (1989). The affective lability scales:

development, reliability, and validity. *Journal of Clinical Psychology*, *45*(5), 786–793. http://doi.org/10.1002/1097-4679(198909)45:5<786::AID-JCLP2270450515>3.0.CO;2-P

Havermans, R., Nicolson, N. A., Berkhof, J., & DeVries, M. W. (2010). Mood reactivity to daily events in patients with remitted bipolar disorder. *Psychiatry Research*, *179*(1), 47–52. http://doi.org/10.1016/j.psychres.2009.10.020

Hay, A. C., Sheppes, G., Gross, J. J., & Gruber, J. (2015). Choosing How to Feel : Emotion Regulation Choice in Bipolar Disorder. *Emotion (Washington, D.C.)*, *15*(2), 139–145.

Henry, C., M'Bailara, K., Mathieu, F., Poinsot, R., & Falissard, B. (2008). Construction and validation of a dimensional scale exploring mood disorders: MAThyS (Multidimensional Assessment of Thymic States). *BMC Psychiatry*, *8*, 82. http://doi.org/10.1186/1471-244X-8-82

Henry, C., M'Baïlara, K., Poinsot, R., Casteret, A. A., Sorbara, F., Leboyer, M., & Vieta, E. (2007). Evidence for two types of bipolar depression using a dimensional approach. *Psychotherapy and Psychosomatics*, *76*, 325–331. http://doi.org/10.1159/000107559

Henry, C., Mitropoulou, V., New, A. S., Koenigsberg, H. W., Silverman, J., & Siever, L. J. (2001a). Affective instability and impulsivity in borderline personality and bipolar II disorders: similarities and differences. *Journal of Psychiatric Research*, *35*(6), 307–312. http://doi.org/10.1016/S0022-3956(01)00038-3

Henry, C., Mitropoulou, V., New, A. S., Koenigsberg, H. W., Silverman, J., & Siever, L. J. (2001b). Affective instability and impulsivity in borderline personality and bipolar II disorders: similarities and differences. *Journal of Psychiatric Research*, *35*(6), 307–312. http://doi.org/10.1016/S0022-3956(01)00038-3

Henry, C., Phillips, M., Leibenluft, E., M'Bailara, K., Houenou, J., & Leboyer, M. (2012). Emotional dysfunction as a marker of bipolar disorders. *Frontiers in Bioscience (Elite Edition)*, *4*, 2722–30. Retrieved from /pmc/articles/PMC3927326/?report=abstract

Henry, C., Van den Bulke, D., Bellivier, F., Roy, I., Swendsen, J., M'Baïlara, K., … Leboyer, M. (2008). Affective lability and affect intensity as core dimensions of bipolar disorders during euthymic period. *Psychiatry Research*, *159*(1–2), 1–6. http://doi.org/10.1016/j.psychres.2005.11.016

Hill, C. L. M., & Updegraff, J. a. (2012). Mindfulness and its relationship to emotional regulation. *Emotion (Washington, D.C.)*, *12*(1), 81–90. http://doi.org/10.1037/a0026355

Hofvander, B., Delorme, R., Chaste, P., Nyden, A., Wentz, E., Stahlberg, O., … Leboyer, M. (2009). Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry*, *9*, 35–43.

Houshmand, K., Braunig, P., Gauggel, S., Kliesow, K., Sarkar, R., & Kruger, S. (2010). Emotional vulnerability and cognitive control in patients with bipolar disorder and their healthy siblings: A pilot study. *Acta Neuropsychiatrica*, *22*(2), 54–62. http://doi.org/10.1111/j.1601-5215.2010.00451.x

Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism*, *4*(1), 63–83.

Hummer, T. A., Hulvershorn, L. A., Karne, H. S., Gunn, A. D., Wang, Y., & Anand, A. (2013). Emotional response inhibition in bipolar disorder: A functional magnetic resonance imaging study of trait- and state-related abnormalities. *Biological Psychiatry*, *73*(2), 136–143. http://doi.org/10.1016/j.biopsych.2012.06.036

Hurst, R. M., Nelson-Gray, R. O., Mitchell, J. T., & Kwapil, T. R. (2007). The relationship of Asperger's characteristics and schizotypal personality traits in a non-clinical adult sample. *Journal of Autism and Developmental Disorders*, *37*(9), 1711–20. http://doi.org/10.1007/s10803-006-0302-z

Ives-Deliperi, V. L., Howells, F., Stein, D. J., Meintjes, E. M., & Horn, N. (2013). The

effects of mindfulness-based cognitive therapy in patients with bipolar disorder: a controlled functional MRI investigation. *Journal of Affective Disorders*, *150*(3), 1152–7. http://doi.org/10.1016/j.jad.2013.05.074

Johnson, S. L., McKenzie, G., & McMurrich, S. (2008). Ruminative Responses to Negative and Positive Affect Among Students Diagnosed with Bipolar Disorder and Major Depressive Disorder. *Cognitive Therapy and Research*, *32*(5), 702–713. http://doi.org/10.1007/s10608-007-9158-6

Johnson, S. L., Tharp, J. A., Peckham, A. D., & Mcmaster, K. J. (2016). Emotion in Bipolar I Disorder : Implications for Functional and Symptom Outcomes. *Journal of Abnormal Psychology*, *125*(1), 40–52.

Kanske, P., Heissler, J., Schönfelder, S., Forneck, J., & Wessa, M. (2013). Neural correlates of emotional distractibility in bipolar disorder patients, unaffected relatives, and individuals with hypomanic personality. *The American Journal of Psychiatry*, *170*(12), 1487–96. http://doi.org/10.1176/appi.ajp.2013.12081044

Kendler, K. S., Gruenberg, A. M., & Strauss, J. S. (1981). An independent analysis of the Copenhagen sample of the Danish adoption study of schizophrenia. II. The relationship between schizotypal personality disorder and schizophrenia. *Archives of General Psychiatry*, *38*(9), 982–4. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7283669

King, B. H., & Lord, C. (2011). Is schizophrenia on the autism spectrum? *Brain Research*, *1380*(0), 34–41. http://doi.org/10.1016/j.brainres.2010.11.031

Kramer, U. (2012). Observer-rated Coping Associated with Borderline Personality Disorder: An Exploratory Study. *Clinical Psychology & Psychotherapy*, *251*(December 2012), 242–251. http://doi.org/10.1002/cpp.1832

Kuhn, R. (2004). Eugen Bleuler's concepts of psychopathology. *History of Psychiatry*, *15*(3), 361–366.

Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., … Huppert, F. (2013). Effectiveness of the Mindfulness in Schools Programme: non-randomised controlled feasibility study. *The British Journal of Psychiatry*, *203*(2), 126–131. http://doi.org/10.1192/bjp.bp.113.126649

La Malfa, G., Lassi, S., Bertelli, M., Salvini, R., & Placidi, G. F. (2004). Autism and intellectual disability: A study of prevalence on a sample of the Italian population. *Journal of Intellectual Disability Research*, *48*(3), 262–267. http://doi.org/10.1111/j.1365-2788.2003.00567.x

Langdon, R., Coltheart, M., & Ward, P. B. (2006). Empathetic perspective-taking is impaired in schizophrenia: evidence from a study of emotion attribution and theory of mind. *Cognitive Neuropsychiatry*, *11*(2), 133–55. http://doi.org/10.1080/13546800444000218

Larson, F. V., Wagner, A. P., Jones, P. B., Tantam, D., Lai, M.-C., Baron-Cohen, S., & Holland, A. J. (2017). Psychosis in autism: a comparison of the features of both conditions in a dually-affected cohort. *British Journal of Psychiatry*, *210*(4), 269–275.

Lawton, M. P., Kleban, M. H., Rajagopal, D., & Dean, J. (1992). Dimensions of affective experience in three age groups. *Psychology and Aging*, *7*(2), 171–184. http://doi.org/10.1037/0882-7974.7.2.171

Lee, J., Altshuler, L., Glahn, D. C., Miklowitz, D. J., Ochsner, K., & Green, M. F. (2013). Social and nonsocial cognition in bipolar disorder and schizophrenia: Relative levels of impairment. *American Journal of Psychiatry*, *170*(3), 334–341. http://doi.org/10.1176/appi.ajp.2012.12040490

Lemaire, M., Aguillon-Hernandez, N., Bonnet-Brilhault, F., Martineau, J., & El-Hage, W. (2014). Subjective and physiological emotional response in euthymic bipolar patients: a pilot study. *Psychiatry Research*, *220*(1–2), 294–301.

http://doi.org/10.1016/j.psychres.2014.07.002
Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, H. L. (1991). Cognitive-Behavioral Treatment of Chronically Parasuicidal Borderline Patients. *Archive of General Psychiatry*, *48*(April), 1060–1064. http://doi.org/10.1001/archpsyc.1991.01810360024003
Lockwood, P. L., Seara-Cardoso, A., & Viding, E. (2014). Emotion Regulation Moderates the Association between Empathy and Prosocial Behavior. *PLoS ONE*, *9*(5), e96555. http://doi.org/10.1371/journal.pone.0096555
Look, A. E., Flory, J. D., Harvey, P. D., & Siever, L. J. (2010). Psychometric properties of a short form of the Affective Lability Scale (ALS-18). *Personality and Individual Differences*, *49*(3), 187–191. http://doi.org/10.1016/j.paid.2010.03.030
Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview-Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, *24*(5), 659–685.
Mackinnon, D. F., & Pies, R. (2006). Affective instability as rapid cycling: theoretical and clinical implications for borderline personality and bipolar spectrum disorders. *Bipolar Disorders*, *8*(1), 1–14. http://doi.org/10.1111/j.1399-5618.2006.00283.x
Mahon, K., Perez-Rodriguez, M. M., Gunawardane, N., & Burdick, K. E. (2013). Dimensional endophenotypes in bipolar disorder: Affective dysregulation and psychosis proneness. *Journal of Affective Disorders*, *151*(2), 695–701. http://doi.org/10.1016/j.jad.2013.08.003
Matson, J. L., & Kozlowski, A. M. (2011). The increasing prevalence of autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*(1), 418–425. http://doi.org/10.1016/j.rasd.2010.06.004
Mayer, J. D. (2002). *Mayer-Salovey-Caruso emotional intelligence test*. Toronto: Multi-Health Systems.
Mazefsky, C. A., & White, S. W. (2014). Emotion regulation: concepts and practice in autism spectrum disorder. *Child and Adolescent Psychiatric Clinics of North America*, *23*(1), 15–24. http://doi.org/10.1016/j.chc.2013.07.002
McGuffin, P., Rijsdijk, F., Andrew, M., Sham, P., Katz, R., & Cardno, A. (2003). The Heritability of Bipolar Affective Disorder and the Genetic Relationship to Unipolar Depression. *Archives of General Psychiatry*, *60*(5), 497. http://doi.org/10.1001/archpsyc.60.5.497
McIntosh, W. D., & Martin, L. L. (1992). The cybernetics of happiness: the relation of goal attainment, rumination, and affect. In M. S. Clark (Ed.), *Emotion and social behavior. Review of personality and social psychology* (pp. 222–246). Thousand Oaks, CA: SAGE Publications.
Mealey, A., Abbott, G., Byrne, L. K., & McGillivray, J. (2014). Overlap between autistic and schizotypal personality traits is not accounted for by anxiety and depression. *Psychiatry Research*, *219*(2), 380–5. http://doi.org/10.1016/j.psychres.2014.05.040
Melville, C. A., Cooper, S.-A., Morrison, J., Smiley, E., Allan, L., Jackson, A., … Mantry, D. (2008). The prevalence and incidence of mental ill-health in adults with autism and intellectual disabilities. *Journal of Autism and Developmental Disorders*, *38*, 1676–1688.
Mendlowicz, M. V., Jean-Louis, G., Kelsoe, J. R., & Akiskal, H. S. (2005). A comparison of recovered bipolar patients, healthy relatives of bipolar probands, and normal controls using the short TEMPS-A. *Journal of Affective Disorders*, *85*(1–2), 147–151. http://doi.org/10.1016/j.jad.2004.01.012
Mercer, L., & Becerra, R. (2013). A unique emotional processing profile of euthymic bipolar

disorder? A critical review. *Journal of Affective Disorders*, *146*(3), 295–309. http://doi.org/10.1016/j.jad.2012.10.030
Michaels, T. M., Horan, W. P., Ginger, E. J., Martinovich, Z., Pinkham, A. E., & Smith, M. J. (2014). Cognitive empathy contributes to poor social functioning in schizophrenia: Evidence from a new self-report measure of cognitive and affective empathy. *Psychiatry Research*, *220*(3), 803–810. http://doi.org/10.1016/j.psychres.2014.08.054
Morioka, H., Kawaike, Y., Sameshima, H., & Ijichi, S. (2013). Behavioral and cognitive core domains shared between autism spectrum disorder and schizophrenia. *Open Journal of Psychiatry*, *3*(April), 26–31. http://doi.org/10.4236/ojpsych.2013.32A005
Myin-Germeys, I., van Os, J., Schwartz, J. E., Stone, A. A., & Delespaul, P. A. (2001). Emotional reactivity to daily life stress in psychosis. *Archives of General Psychiatry*, *58*(12), 1137–1144. http://doi.org/10.1001/archpsyc.58.12.1137
Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*(4), 569–582. http://doi.org/10.1037/0021-843X.100.4.569
Nuechterlein, K. H., & Dawson, M. E. (1984). A Heuristic Vulnerability/Stress Model of Schizophrenic Episodes. *Schizophrenia Bulletin*, *10*(2), 300–312. http://doi.org/10.1093/schbul/10.2.300
O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, *41*(5), 673–690. http://doi.org/10.1007/s11135-006-9018-6
Ousley, O., & Cermak, T. (2014). Autism Spectrum Disorder: Defining Dimensions and Subgroups. *Current Developmental Disorders Reports*, *1*(1), 20–28. http://doi.org/10.1007/s40474-013-0003-1
Ozonoff, S., Rogers, S. J., & Pennington, B. F. (1991). Asperger's Syndrome: Evidence of an Empirical Distinction from High-Functioning Autism. *Journal of Child Psychology and Psychiatry*, *32*(7), 1107–1122.
Pankowski, S., Adler, M., Andersson, G., Lindefors, N., & Svanborg, C. (2017). Group acceptance and commitment therapy (ACT) for bipolar disorder and co-existing anxiety – an open pilot study. *Cognitive Behaviour Therapy*, *46*(2), 114–128. http://doi.org/10.1080/16506073.2016.1231218
Paris, J., Gunderson, J., & Weinberg, I. (2007). The interface between borderline personality disorder and bipolar spectrum disorders. *Comprehensive Psychiatry*, *48*(2), 145–54. http://doi.org/10.1016/j.comppsych.2006.10.001
Park, J., Ayduk, O., O'Donnell, L., Chun, J., Gruber, J., Kamali, M., … Kross, E. (2014). Regulating the High: Cognitive and Neural Processes Underlying Positive Emotion Regulation in Bipolar I Disorder. *Clinical Psychological Science*, *2*(6), 661–674. http://doi.org/10.1177/2167702614527580
Pavlova, B., Uher, R., Dennington, L., Wright, K., & Donaldson, C. (2011). Reactivity of affect and self-esteem during remission in bipolar affective disorder: an experimental investigation. *Journal of Affective Disorders*, *134*(1–3), 102–11. http://doi.org/10.1016/j.jad.2011.04.023
Perugi, G., Angst, J., Azorin, J.-M., Bowden, C., Vieta, E., & Young, A. H. (2013). Is comorbid borderline personality disorder in patients with major depressive episode and bipolarity a developmental subtype? Findings from the international BRIDGE study. *Journal of Affective Disorders*, *144*(1–2), 72–78. http://doi.org/10.1016/j.jad.2012.06.008
Phillips, M. L. (2006). The neural basis of mood dysregulation in bipolar disorder. *Cognitive Neuropsychiatry*, *11*(December), 233–249. http://doi.org/10.1080/13546800444000290
Phillips, M. L., Ladouceur, C. D., & Drevets, W. C. (2008). A neural model of voluntary and automatic emotion regulation: implications for understanding the pathophysiology and

neurodevelopment of bipolar disorder. *Molecular Psychiatry*, *13*(9), 829, 833–57. http://doi.org/10.1038/mp.2008.65

Raine, A. (1991). The SPQ: a scale for the assessment of schizotypal personality based on DSM-III-R criteria. *Schizophrenia Bulletin*, *17*(4), 555–564. http://doi.org/10.1093/schbul/17.4.555

Reed, T., & Peterson, C. (1990). A comparative study of autistic subjects' performance at two levels of visual and cognitive perspective taking. *Journal of Autism and Developmental Disorders*, *20*(4), 555–567. http://doi.org/10.1007/BF02216060

Reich, D. B., Zanarini, M. C., & Fitzmaurice, G. (2012). Affective lability in bipolar disorder and borderline personality disorder. *Comprehensive Psychiatry*, *53*(3), 230–237. http://doi.org/10.1016/j.comppsych.2011.04.003

Reinares, M., Sánchez-Moreno, J., & Fountoulakis, K. N. (2014). Psychosocial interventions in bipolar disorder: What, for whom, and when. *Journal of Affective Disorders*, *156*, 46–55. http://doi.org/10.1016/j.jad.2013.12.017

Reniers, R. L. E. P., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. a. (2011). The QCAE: a Questionnaire of Cognitive and Affective Empathy. *Journal of Personality Assessment*, *93*(1), 84–95. http://doi.org/10.1080/00223891.2010.528484

Rice, C., Chandler, E., Harrison, E., Liddiard, K., & Ferrari, M. (2015). Project Re•Vision: disability at the edges of representation. *Disability & Society*, *30*(4), 513–527. http://doi.org/10.1080/09687599.2015.1037950

Rihmer, Z., & Benazzi, F. (2010). Impact on suicidality of the borderline personality traits impulsivity and affective instability. *Annals of Clinical Psychiatry : Official Journal of the American Academy of Clinical Psychiatrists*, *22*(2), 121–8. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20445839

Rive, M. M., Mocking, R. J. T., Koeter, M. W. J., van Wingen, G., de Wit, S. J., van den Heuvel, O. a., … Schene, A. H. (2015). State-Dependent Differences in Emotion Regulation Between Unmedicated Bipolar Disorder and Major Depressive Disorder. *JAMA Psychiatry*, *72*(7), 1–10. http://doi.org/10.1001/jamapsychiatry.2015.0161

Rossi, a, & Daneluzzo, E. (2002). Schizotypal dimensions in normals and schizophrenic patients: a comparison with other clinical samples. *Schizophr Res*, *54*(1–2), 67–75. http://doi.org/10.1016/S0920-9964(01)00353-X

Rowland, J. E., Hamilton, M. K., Lino, B. J., Ly, P., Denny, K., Hwang, E.-J., … Green, M. J. (2013). Cognitive regulation of negative affect in schizophrenia and bipolar disorder. *Psychiatry Research*, *208*(1), 21–8. http://doi.org/10.1016/j.psychres.2013.02.021

Rowland, J. E., Hamilton, M. K., Vella, N., Lino, B. J., Mitchell, P. B., & Green, M. J. (2013). Adaptive associations between social cognition and emotion regulation are absent in schizophrenia and bipolar disorder. *Frontiers in Psychology*, *3*(January), 1–12. http://doi.org/10.3389/fpsyg.2012.00607

Ruggero, C. J., & Johnson, S. L. (2006). Reactivity to a laboratory stressor among individuals with bipolar I disorder in full or partial remission. *Journal of Abnormal Psychology*, *115*(3), 539–544.

Russell-Smith, S. N., Maybery, M. T., & Bayliss, D. M. (2011). Relationships between autistic-like and schizotypy traits: An analysis using the Autism Spectrum Quotient and Oxford-Liverpool Inventory of Feelings and Experiences. *Personality and Individual Differences*, *51*(2), 128–132. http://doi.org/10.1016/j.paid.2011.03.027

Ruzich, E., Allison, C., Smith, P., Watson, P., Auyeung, B., Ring, H., & Baron-Cohen, S. (2015). Measuring autistic traits in the general population: a systematic review of the Autism-Spectrum Quotient (AQ) in a nonclinical population sample of 6,900 typical adult males and females. *Molecular Autism*, *6*, 2. http://doi.org/10.1186/2040-2392-6-2

Salvatore, P., Baldessarini, R. J., Tohen, M., Khalsa, H. M., Sanchez-Toledo, J. P., Zarate

Jr., C. A., … Maggini, C. (2009). McLean-Harvard International First-Episode Project: two-year stability of DSM-IV diagnoses in 500 first-episode psychotic disorder patients. *J Clin Psychiatry*, *70*(4), 458–466. http://doi.org/ej08m04227 [pii]

Salvatore, P., Baldessarini, R. J., Tohen, M., Khalsa, H. M., Sanchez-Toledo, J. P., Zarate Jr., C. A., … Maggini, C. (2011). McLean-Harvard International First-Episode Project: two-year stability of ICD-10 diagnoses in 500 first-episode psychotic disorder patients. *J Clin Psychiatry*, *72*(2), 183–193. http://doi.org/10.4088/JCP.09m05311yel

Sasson, N. J., Pinkham, A. E., Weittenhiller, L. P., Faso, D. J., & Simpson, C. (2016). Context Effects on Facial Affect Recognition in Schizophrenia and Autism: Behavioral and Eye-Tracking Evidence. *Schizophrenia Bulletin*, *42*(3), 675–683. http://doi.org/10.1093/schbul/sbv176

Shouse, E. (2005). Feeling, emotion, affect. *M/C Journal*, *8*(6). Retrieved from http://journal.media-culture.org.au/0512/03-shouse.php

Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the Social Deficits of Autism: the Contribution of Non???Verbal Communication Measures. *Journal of Child Psychology and Psychiatry*, *27*(5), 657–669. http://doi.org/10.1111/j.1469-7610.1986.tb00190.x

Spaapen, D. L., Waters, F., Brummer, L., Stopa, L., & Bucks, R. S. (2014). The Emotion Regulation Questionnaire: validation of the ERQ-9 in two community samples. *Psychological Assessment*, *26*(1), 46–54. http://doi.org/10.1037/a0034474

Spek, A. A., & Wouters, S. G. M. M. (2010). Autism and schizophrenia in high functioning adults: behavioral differences and overlap. *Research in Autism Spectrum Disorders*, *4*(4), 709–717. http://doi.org/10.1016/j.rasd.2010.01.009

Stallard, P., Sayal, K., Phillips, R., Taylor, J. A., Spears, M., Anderson, R., … Montgomery, A. A. (2012). Classroom based cognitive behavioural therapy in reducing symptoms of depression in high risk adolescents: pragmatic cluster randomised controlled trial. *BMJ (Clinical Research Ed.)*, *345*(5), e6058. http://doi.org/10.1136/BMJ.E6058

Stegge, H., & Terwogt, M. M. (2007). Awareness and regulation of emotion in typical and atypical development. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 269–286). London: Guilford Press.

Stratta, P., Tempesta, D., Bonanni, R. L., de Cataldo, S., & Rossi, A. (2014). Emotional reactivity in bipolar depressed patients. *Journal of Clinical Psychology*, *70*(9), 860–5. http://doi.org/10.1002/jclp.22072

Tantam, D., & Girgis, S. (2009). Recognition and treatment of Asperger syndrome in the community. *British Medical Bulletin*, *89*, 41–62.

Thomas, J., Knowles, R., Tai, S., & Bentall, R. P. (2007). Response styles to depressed mood in bipolar affective disorder. *Journal of Affective Disorders*, *100*(1–3), 249–52. http://doi.org/10.1016/j.jad.2006.10.017

Townsend, J., & Altshuler, L. L. (2012). Emotion processing and regulation in bipolar disorder: a review. *Bipolar Disorders*, *14*(4), 326–39. http://doi.org/10.1111/j.1399-5618.2012.01021.x

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination Reconsidered: A Psychometric Analysis. *Cognitive Therapy and Research*, *27*(3), 247–259. http://doi.org/10.1023/A:1023910315561

Tsakanikos, E., Costello, H., Holt, G., Bouras, N., Sturmey, P., & Newton, T. (2006). Psychopathology in adults with autism and intellectual disability. *Journal of Autism and Developmental Disorders*, *36*, 1123–1129.

Van der Gucht, E., Morriss, R., Lancaster, G., Kinderman, P., & Bentall, R. P. (2009). Psychological processes in bipolar affective disorder: negative cognitive style and reward processing. *The British Journal of Psychiatry*, *194*(2), 146–51. http://doi.org/10.1192/bjp.bp.107.047894

Van Dijk, S., Jeffrey, J., & Katz, M. R. (2013). A randomized, controlled, pilot study of dialectical behavior therapy skills in a psychoeducational group for individuals with bipolar disorder. *Journal of Affective Disorders*, *145*(3), 386–393. http://doi.org/10.1016/j.jad.2012.05.054

Van Rheenen, T. E., Murray, G., & Rossell, S. L. (2015). Emotion regulation in bipolar disorder: Profile and utility in predicting trait mania and depression propensity. *Psychiatry Research*, *225*(3), 425–432. http://doi.org/10.1016/j.psychres.2014.12.001

Van Rheenen, T. E., & Rossell, S. L. (2014). Phenomenological predictors of psychosocial function in bipolar disorder: is there evidence that social cognitive and emotion regulation abnormalities contribute? *The Australian and New Zealand Journal of Psychiatry*, *48*(1), 26–35. http://doi.org/10.1177/0004867413508452

Van Winkel, R., Stefanis, N. C., & Myin-Germeys, I. (2008). Psychosocial stress and psychosis. A review of the neurobiological mechanisms and the evidence for gene-stress interaction. *Schizophrenia Bulletin*, *34*(6), 1095–1105. http://doi.org/10.1093/schbul/sbn101

Vannucchi, G., Masi, G., Toni, C., Dell'Osso, L., Erfurth, A., & Perugi, G. (2014). Bipolar disorder in adults with Asperger′s Syndrome: a systematic review. *Journal of Affective Disorders*, *168*, 151–60. http://doi.org/10.1016/j.jad.2014.06.042

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ*, *335*(7624).

White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., & Mitchell, G. (2011). A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy*, *49*(12), 901–907. http://doi.org/10.1016/j.brat.2011.09.003

Williams White, S., Keonig, K., & Scahill, L. (2007). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorders*, *37*(10), 1858–1868. http://doi.org/10.1007/s10803-006-0320-x

Wolkenstein, L., Zwick, J. C., Hautzinger, M., & Joormann, J. (2014). Cognitive emotion regulation in euthymic bipolar disorder. *Journal of Affective Disorders*, *160*, 92–7. http://doi.org/10.1016/j.jad.2013.12.022

Woodbury-Smith, M. R., Boyd, K., & Szatmari, P. (2010). Autism spectrum disorders, schizophrenia and diagnostic confusion. *Journal of Psychiatric Neuroscience*, *35*(5), 360.

World Health Organisation. (2007). International Statistical Classification of Diseases and Related Health Problems.

Zajonc, R. B. (1980). Feeling and thinking. *American Psychologist*, *35*(2), 151–175.

Empirical research paper: Factors related to schizotypal traits in autistic people and healthy controls, and their relation to psychosis

Abstract

Introduction: *Autism spectrum disorders (ASD) are complex conditions involving impairments in a number of social and communicative domains. There is an overlap between ASD and psychotic mental health problems. Making sense of this using categorical conceptualisations of the two conditions has been difficult. This study uses a dimensional approach to measure autistic and schizotypal (as a proxy for psychosis) traits, and explores the impact of emotional regulation (ER), affective lability, and perspective taking on these traits.* ***Method:*** *Participants in a previous research study of autism and psychosis who were dually affected by these conditions were invited to take part (n=20). Additionally, five other autistic people with a history of psychosis were recruited. A comparison group of neurotypical individuals (n=43) was recruited via social media, and a group of autistic people without history of psychosis (n=59) recruited through a research database. All groups completed questionnaires measuring the variables of interest. Data were analysed primarily using regression analyses.* ***Results:*** *As predicted, autistic and schizotypal traits were highly correlated. Affective lability increased as positive schizotypal traits increased. Negative schizotypy was related to higher affective lability, but also a number of other traits measured. Disorganised schizotypy was related to more affective lability and more communication difficulties. Autistic people who had experienced psychosis reported more affective lability and fewer autistic traits than autistic people who have not experienced psychosis.* ***Conclusions:*** *Affective lability seems to play an important role in the possible development of psychopathology and should be investigated further in the context of psychosis and autism.*

Introduction

Autism spectrum disorders (ASD) are life-long neurodevelopmental conditions affecting an individual's perception of and interaction with the world (Ousley & Cermak, 2014). ASD refers to a number of heterogeneous "autisms" (Geschwind & Levitt, 2007), conditions that share core features of unusual perceptual abilities (Dakin & Frith, 2005), social communication difficulties (Sigman, Ungerer, & Sherman, 1986), and difficulties interpreting social cues (Dawson et al., 2004) but differ subtly from individual to individual. Some argue that discrete and fairly homogenous subtypes of autism can be defined, such as Asperger's syndrome (Ozonoff, Rogers, & Pennington, 1991; Tantam & Girgis, 2009), although some current diagnostic criteria do not make such distinctions (American Psychiatric Association, 2013). In the current study, no distinction will be made between subtypes of ASD.

Since the first definition of autism, a description by Bleuler of what we might now consider the negative symptoms of psychotic mental illness (Kuhn, 2004), there has been a persistent debate about the relationship between the experiences of the autistic people (AP; an identity-first label for individuals who meet diagnostic criteria for ASD, preferred by some in the autistic community; see https://www.identityfirstautistic.org/ for more information) and the experience of mental illness. The current study aims to explore this relationship by drawing on dimensional approaches to understanding their similarities and differences. It is hoped that this exploration will contribute to a richer understanding of this relationship and, ultimately, better outcomes for individuals at a clinical level through the adaptation of clinical practice.

First, the evidence about rates and nature of mental health problems in AP will be explored, with a focus on difficulties researching in this area and disorders with high prevalence in AP. Then the dimensional concepts of schizotypy, emotional regulation (ER), and empathy will be discussed in relation to autism and psychosis.

Mental health, intellectual ability, and autism

AP are known to experience a number of mental health problems at greater rates than neurotypical people (the autistic movement's term for people who are not autistic). One potential confounding factor is intellectual disability (ID). Despite methodological issues of research in this area (Matson & Kozlowski, 2011), it is clear that rates of ID are high in AP – up to 70% estimated by one study (La Malfa, Lassi, Bertelli, Salvini, & Placidi, 2004). Compared to individuals with ID, those with ID and ASD appear to be at no greater risk of developing additional mental health problems (Melville et al., 2008; Tsakanikos et al., 2006), but individuals with ID are at much greater risk of mental health problems than the general population (Cooper, Smiley, Morrison, Williamson, & Allan, 2006).

However, among so-called "high-functioning" AP, a term that generally refers to individuals who do not have ID, ASD correlates with increased rates of depression, anxiety, bi-polar disorder, and psychosis, and experience of overall fair to poor quality of life (Cederlund, Hagberg, Billsted, Gillberg, & Gillberg, 2008; Hofvander et al., 2009; Howlin, 2000; Vannucchi et al., 2014). This higher rate of co-morbidity may be due to underlying biological/genetic factors, cognitive style or emotional regulation (ER) difficulties, or other as-yet unknown factors increasing vulnerability to stress, for example. Equally, it could be explained by the experiences of AP in a "neurotypical world", which may inherently be stressful for them, or due to other sources of stress related to sensory processing difficulties, for example. In the context of a stress-vulnerability model of mental illness (Nuechterlein & Dawson, 1984), this could explain increased co-morbidity in this group, particularly psychosis. Reactivity to stress has been found to be significantly correlated with familial risk of psychosis (Myin-Germeys, van Os, Schwartz, Stone, & Delespaul, 2001). Expanding on this, it has been argued that prolonged exposure to psychosocial stress increases risk of psychosis (Van Winkel, Stefanis, & Myin-Germeys, 2008).

Psychosis and autism

The association between ASD and psychosis is complex and has a complex history of changing understandings through the decades. It is of interest both theoretically and clinically, and research in this area can help improve understanding of risk factors, phenomenology, and effective ways of helping individuals with these conditions. The current understanding of the relationship will be explored in this section.

There are biological hints that ASD and psychosis may be related (de Lacy & King, 2013), particularly ASD and schizophrenia, with overlapping genetic (Burbach & van der Zwaag, 2009) and neurobiological features (de Lacy & King, 2013). Behaviourally and cognitively, too, there is considerable overlap between the negative symptoms of psychosis and ASD (Couture et al., 2010; Woodbury-Smith, Boyd, & Szatmari, 2010), which has led some to suggest that ASD might form part of the same spectrum as schizophrenia-spectrum disorders (SSDs) (King & Lord, 2011).

To complicate the picture further, while certain aspects of psychosis and ASD seem to be held in common, others differ (Morioka, Kawaike, Sameshima, & Ijichi, 2013). For example, difficulties with motivation, understanding others' perspectives/emotions, and executive functioning occur in both populations, whereas individuals with psychosis may experience hallucinations or delusions that AP do not. Even within areas of overlapping deficit, there are often subtle differences that hint at related but different mechanisms. For example, a recent investigation into facial affect processing in AP and people with SSD found a pattern of responding that was moderated by IQ in the SSD group, but not in the AP group (Sasson, Pinkham, Weittenhiller, Faso, & Simpson, 2016).

Chisholm and colleagues (2015) reviewed eight possible models of relationship between ASD and SSDs, and concluded that the evidence was strongest for four models – ASD as vulnerability factor to psychosis, the diametrical model, associated liabilities model,

and the multiple overlapping aetiologies model. From the evidence available, they were not able to choose a single model that is clearly the best fit. They highlight that these models may not be mutually exclusive, and that there are likely to be subgroups for whom one model or another may be a better explanatory fit. Thus, any research into an overlap between ASD and psychosis will be informed by and influence discussion of an explanatory model of that overlap.

Autism and schizotypy

In order to understand the relationship between ASD and psychosis, some researchers have attempted to map ASD traits and psychotic traits into the same space. Researchers have used a personality construct called schizotypy as a proxy for "psychosis-proneness" (Rossi & Daneluzzo, 2002). Schizotypy is characterised by magical thinking, strange experiences, social withdrawal, and other features, and can broadly be divided to include factors called positive, negative, or disorganised (Johns & van Os, 2001). Like ASD, it can be considered a spectrum that blends into normality – all people have schizotypal traits, but these are usually not clinically significant. At the extreme end, schizotypal traits might lead to a diagnosis of schizotypal personality disorder, a condition strongly linked to psychosis (Kendler, Gruenberg, & Strauss, 1981). This makes it perhaps easier to compare ASD (a collection of traits) to schizotypy (another set of traits), rather than psychosis (a state that changes over time and might at any time be considered present or absent).

Research has found correlations between certain subscales of schizotypy and ASD. These concepts have been compared in general population samples (Dinsdale, Hurd, Wakabayashi, Elliot, & Crespi, 2013; Ford & Crewther, 2014; Hurst, Nelson-Gray, Mitchell, & Kwapil, 2007; Mealey, Abbott, Byrne, & McGillivray, 2014; Russell-Smith, Maybery, & Bayliss, 2011), AP (Barneveld et al., 2011; Spek & Wouters, 2010), as well as in people with psychosis (Spek & Wouters, 2010) and schizotypal personality disorder (Esterberg, Ousley,

Cubells, & Walker, 2013; Esterberg, Trotman, Brasfield, Compton, & Walker, 2008). The results of this combined research indicate that certain aspects of ASD and schizotypy are related even in non-clinical samples, while others vary by group membership. For example, there seems to be a robust overlap between negative symptoms of schizotypy and autistic traits (e.g. Barnevald et al., 2011). Social skill deficit seems specific to ASD, and positive schizotypy (for example, unusual experiences) seems specific to schizotypy (Spek & Wouters, 2010).

Both Dinsdale et al. (2013) and Ford and Crewther (2014) have attempted to create factors that combine features of ASD and schizotypy, as measured by the Autism Quotient (AQ) (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) and measures such as the Schizotypal Personality Questionnaire (SPQ) (Raine, 1991) or the SPQ-Brief Revised (SPQ-BR) (A. S. Cohen, Matthews, Najolia, & Brown, 2010). Both research groups utilised large amounts of data from general population samples, but reached different conclusions. Dinsdale et al. (2013) found a two-factor solution, and argued that there was a clear division between autistic and schizotypal traits, adding further support for a theory that defined ASD and schizophrenia as diametrical opposites (Crespi & Badcock, 2008). Ford and Crewther (2014), however, defined a three-factor solution that presents a more complex relationship between the traits. While there were two factors that segregated between the measures, indicating separate autistic ("social disorganisation") and schizotypal ("perceptual oddities") constructs, these explained much less variance than the third factor which included items from both the AQ and the SPQ. They term the construct that this factor measures "social rigidity" and postulate that this factor underlies many of the difficulties experienced by both AP and people who experience high levels of schizotypy.

While these general investigations of the relationships between constructs in the general population are informative, little research has investigated AP who experience

psychosis, and to date no examination of schizotypal traits in this group has been published so it is unknown how generalizable the findings reported above actually are. Understanding the differences and relationship between ASD and schizotypy will help define the concepts more accurately and increase knowledge of factors that may affect resilience or risk.

Affective Lability, Emotional Regulation and Empathy

Evidence from research on those dually-diagnosed with ASD and psychosis indicates high rates of mood disruption (Larson et al., 2017). This finding is supported by genetic studies (De Long & Dwyer, 1988) and prevalence data (Vannucchi et al., 2014) linking ASD to bi-polar disorder, indicating the possibility of underlying ER difficulties and/or affective lability in some AP that might increase their likelihood of developing (psychotic) mental illness. Instability of mood, something called lability in psychiatry, has also been linked with bi-polar disorder (H S Akiskal et al., 1995; Henry et al., 2001b), and so seems a particularly important dimension to study given the possibility that categorical divisions between disorders such as bipolar disorder and schizophrenia may not be supported at a genetic level (Craddock & Owen, 2010). ER also provides an important target for the psychological treatment of mental health problems (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Little research has been conducted into ER difficulties in AP, but it is recognised as an area of potential difficulty for this population (Mazefsky & White, 2014).

Another factor of interest is empathy. The diametric model of ASD and schizophrenia suggests that increased empathy may be linked to increased risk of psychosis, through a mechanism of emphasising too much the contents of others' minds (Brosnan, Ashwin, Walker, & Donaghue, 2010; Crespi & Badcock, 2008). Empathy is found to be impaired in AP in general (Baron-Cohen, 2002), but one particular subtype of empathy, perspective taking, has been found to be impaired in both AP (Reed & Peterson, 1990) and, separately, in individuals with schizophrenia (Langdon, Coltheart, & Ward, 2006). Nothing is known about

empathy in AP who have experienced psychosis but it might reasonably be predicted to be impaired.

Summary

Given the complexity of the concepts of ASD and psychosis, there are likely to be many dimensions that can be used to define them and their overlap. The current study has defined four dimensions of interest based on the evidence available (particularly the very limited evidence regarding the experiences of AP who have experienced psychosis): schizotypy, affective lability, ER, and one factor of empathy (perspective taking). Using these dimensions, the current study is designed to further contribute to our understanding of ASD and psychosis, using the responses of neurotypical people, AP, and AP who have experienced psychosis. This richness of participant experience in itself provides a unique feature of the study and is hoped will help with the interpretation of the findings

Aims and hypotheses

The elements defined in this introduction (schizotypal traits, autistic traits, affective lability, ER, and perspective taking) have not been studied together to date in any population. There is also no research exploring affective lability or ER in AP. Thus, the aims of the current study are as follows:

- To investigate the relationship between schizotypal and autistic traits in a sample of AP with and without a history of psychosis
- To explore the relationship of ER, affective lability, and perspective-taking with schizotypal and autistic traits across neurotypical and autistic participants

The hypotheses are as follows:

1. AP will have higher rates of both schizotypal and autistic traits compared with neurotypical controls

2. Schizotypal traits will be higher in AP with a history of psychosis (AP-P) compared with AP who have no history of psychosis (AP-NP)
3. AP-P will have higher rates of non-helpful ER strategies than AP-NP and will also have higher overall rates of affective lability
4. AP-P will have higher perspective taking scores than AP-NP
5. Higher ER difficulties and affective lability will be associated with higher schizotypal scores across participant groups

Method

Ethical approval for the study was given by the North of Scotland NHS Research Ethics Committee in January 2016 (see Appendix 4). Two amendments to the study were also approved to allow wider recruitment in the AP-P group and recruitment of the NC group. The study was conducted between January 2016 and April 2017.

Design

This is an observational study utilising comparison of responses to self-report measures of the key concepts across participant groups. Participants were offered the chance to participate in a prize draw as part of their participation in the research.

Procedures

Participants were recruited to three groups: AP-P, AP-NP, and neurotypical control (NC). The procedures for each group will be described separately below. A flow chart is also shown in Figure 2 to clarify the different procedures by group.

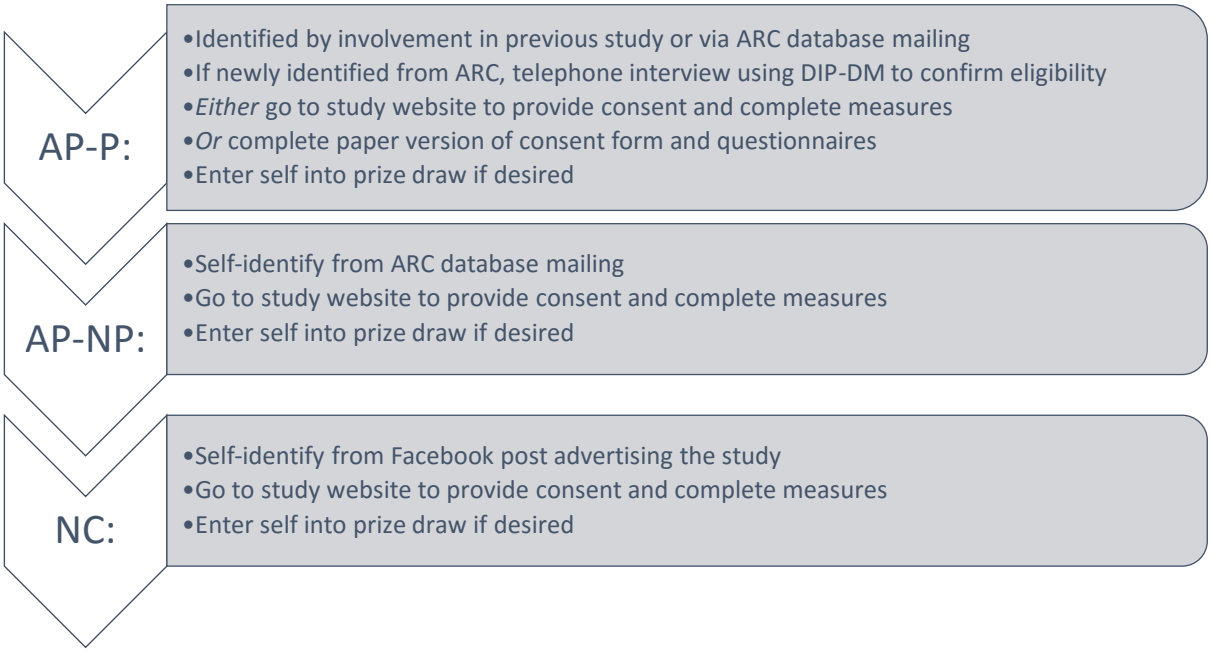

Figure 2. Procedure of study recruitment and data collection, by group.

AP-P

The AP-P group (n=25) was formed of participants in previous research who were invited to take part in the current study (Larson et al., 2017) (n=20) as well as new participants self-identified through the Autism Research Centre's (ARC) participant database (n=5). Where e-mail addresses were available for participants in a previous research study, individuals were e-mailed a brief statement about the research that contained a link. For those for whom there was no e-mail address on record, a copy of the information sheet (Appendix 5), consent form (Appendix 6), and questionnaires was sent in the post along with a reply-paid envelope and a brief note introducing the study.

The five new AP-P participants were recruited by collaboration with the Autism Research Centre (ARC) at the University of Cambridge. The ARC is an internationally reknowned centre of excellence in autism research and they maintain a database of over 1500 AP who are willing to take part in research. Application was made to the ARC to have them use the database to help recruit AP for the study. This involved completing an application form which was reviewed by a committee. After approval, an ARC standard-format e-mail

was sent to eligible participants by the database administrator (see Appendix 7). Individuals who identified as autistic and having experience psychosis contacted the researcher by e-mail. They gave consent to be interviewed about their experiences prior to completing questionnaires, in order to screen for psychosis. These interviews were completed over the telephone and used the Diagnostic Interview for Psychosis (DIP-DM) (Castle et al., 2006) to confirm the presence of a history of psychosis. Participants were only accepted if they confirmed that a diagnosis of ASD had been made by a health professional and they met criteria for a psychotic disorder as described by Larson et al. (2017) on the DIP-DM. They were then e-mailed a link to the same on-line questionnaire as the main AP-P group.

AP-NP

Participants in the AP-NP group (n=59) were also recruited via the ARC database, with a different invitation e-mail (see Appendix 7). They were asked to confirm they had no significant mental health history. Those interested then proceeded to the on-line information sheet (Appendix 5), consent form (Appendix 6), and questionnaires, which were sent as a link in the invitation e-mail. Diagnosis of ASD was not confirmed for this group, but the ARC database is maintained by a respected research group and participants' eligibility checked by ARC, so it was considered reasonable to assume that they represent AP.

NC

NC were recruited from social media advertising (n=43). Specifically, a public post was made on the authors' Facebook page and shared by her contacts. This post contained a brief summary of the study (Appendix 8) and a link to the on-line information sheet (Appendix 5), consent form (Appendix 6), and questionnaires. NC were not formally screened, but were asked to confirm they had no history of ASD diagnosis nor any significant mental health history before taking part.

All Participants

Participants were asked to sign a consent form before completing the questionnaires. At the end of the questionnaires, all participants were invited to take part in a prize draw for one of three gift vouchers for Amazon.co.uk worth £15 each. If an individual wished to take part in the prize draw, they provided an e-mail address that was used for this purpose only and not linked to their data. The prize draw took place using a random number generator and a list of e-mail addresses of those entered into the prize draw. Winners were sent an e-mail link directly from Amazon.co.uk with the electornic gift card included.

The initial contact contained brief information about the research and included either a link to the survey homepage where the full information sheet (see Appendix 5) relevant to the participant group was presented or a copy of the information sheet, consent form, and questionnaires for postal respondants. Participants were asked to read the information sheet and sign a consent form (electronic or paper) before completing the questionnaires.

Information was collected from all participants regarding their age and gender. No other demographic information was collected.

Measures

There are a limited number of self-report measures relevant to the concepts being studied. Efforts were made to identify the most commonly used and highest quality questionnaires in each area. However, efforts were also made to identify psychometrically valid short forms of the questionnaires and these were used where possible to limit burden on participants. Measures were identified from reviewing the literature from the introduction and also using internet searching. All measures used have acceptable reliability and validity.

The following self-report measures were used:

- Autism Spectrum Quotient (AQ) (Baron-Cohen et al., 2001): This is a 50-item questionnaire that measures traits associated with ASD. It contains five subscales (Communication, Social, Imagination, Local Details, and Attention Switching). It is the gold standard in self-reported autistic traits and is used widely in ASD research. The AQ has been shown to have good internal consistency and test-retest reliability.
- Schizotypal Personality Questionnaire – Brief Revised (SPQ-BR) (A. S. Cohen et al., 2010): This is a 32-item questionnaire that measures schizotypal traits. It contains nine subscales (Ideas of Reference, Social Anxiety, Magical Thinking, Unusual Perceptions, Eccentric Behaviour, No Close Friends, Odd Speech, Constricted Affect, and Suspiciousness), which can be categorised into positive, negative, and disorganised traits. This is a validated short-form of the most regularly used self-report measure of schizotypal traits. It was developed using exploratory and confirmatory factor analysis identifying key items from the original scale to maximise internal consistency and factor independence. It has been subjected to further psychometric validation in two large independent samples after its original development and findings of reliability were replicated (Callaway, Cohen, Matthews, & Dinzeo, 2014).
- Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers, Corcoran, Drake, Shryane, & Völlm, 2011), perspective-taking subscale: This is a 10-item subscale of a larger measure. The subscale measures participants' ability to imagine things from perspectives other than their own. It is the only widely-used measure of perspective-taking. It was developed using exploratory and confirmatory factor analyses, with additional construct validity being established by comparing results with a number of well-regarded measures of aggression and temperament. The authors found strong negative correlations with these measures, as they hypothesised.

They also tested for convergent validity by comparing results on the QCAE to an existing measure of a similar construct, finding the expected positive correlation. It is not reported how reliable the measure is over time, with no test-retest data available.

- Affective Lability Scale-18 (ALS-18) (Look, Flory, Harvey, & Siever, 2010): This 18-item measure assesses the extent to which individuals switch between emotional states. It measures changes between euthymia (balanced or neutral mood) and anxiety, depression, elation, and anger. It also measures switches between anxiety/depression and depression/elation. This is a short-form of the most commonly used measure of affective lability. Results correlate strongly with the original ALS, and convergent and discriminant validity was supported by the results of self-report measures of effective and psychosocial functioning. It also has good clinical utility, with individuals with personality disorders linked to affective lability (e.g. BPD) scoring highly compared to individuals with other types of personality disorder or healthy controls. Confirmatory factor analysis found the three factor solution a good fit, but the authors acknowledge another factor model may be more appropriate when interpreting the data. They recommend further exploration of this, which has not yet been completed.
- Emotional Regulation Questionnaire-9 (ERQ-9) (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014): This 9-item questionnaire measures the extent to which individuals utilise one of two distinct coping strategies to manage strong emotion: reappraisal and suppression. Emotional suppression is considered to be a less effective strategy, and so was predicted to be higher in individuals with significant mental health problems (the AP-P group). This is a short-form of one of the most commonly used ER self-report tools. It was developed when analysing the psychometric properties of the original tool in different cultural groups. The original factor structure was found not

to be replicated in two new samples, and the ERQ-9 was developed as a more valid and reliable version. Confirmatory factor analysis shows a good model fit. However, the authors acknowledge that further work should be done to establish the test-retest reliability, predictive validity, and concurrent validity.

Analysis

Data were entered into a spreadsheet and analysed using SPSS version 24. For all measures where there were subscales, both a total score and subscale scores were calculated and entered as variables. Dummy variables were created encoding membership in the AP-P and AP-NP groups. Descriptive statistics were calculated for each group and groups compared using the appropriate test based on the normality of the distribution (either *t*-test or Mann-Whitney *U*). Additionally, the SPQ-BR, AQ, and ALS-18 scores were compared to normative samples to estimate comparability. The following pre-specified analyses were then conducted:

- Linear regression of the main SPQ subscale scores (Positive, Negative, and Disorganised) using AQ total score, gender, age, and group as predictor variables.
- Second linear regression of the main SPQ subscale scores using AQ subscales, group, significant interactions between AQ subscale scores and group, ALS total score, ER styles, QCAE *perspective taking*, age, and gender as predictor variables.
- Logistic regression of AP-P/-NP group membership, looking for the effects of AQ, age, ER style, total ALS-18 score, and QCAE *perspective taking*.
- Within the AP groups, exploration of between-groups differences in euthymia-depression, euthymia-mania, and depression-euthymia scales of the ALS-18 tested using ANOVA. Other ALS-18 scales were tested but with no a-priori hypotheses, and so the significance level was adjusted using the Bonferroni correction method.

The data were tested for suitability of linear regression in the following way:

- The relationship between SPQ-BR scales (Positive, Negative, and Disorganised) were plotted against total AQ scores and fit lines inspected to ensure they were linear.
- The distribution of the residuals in the models were inspected for normality and outliers investigated to ensure they were not having a significant impact on the model by repeating the analysis with and without the outlier present.
- Autocorrelation was assessed using the Durbin Watson statistics for each regression in SPSS. These revealed minimal levels of autocorrelation for each of the three regressions.
- Multicollinearity was examined by calculating variation inflation factors (VIFs) for each variable within each regression. There is not uniform agreement on thresholds for problematic levels of multicollinearity. O'Brien (2007) cites authors suggesting as low as 4 or 5 as problematic, but advises caution in the use of these thresholds. We found only one covariate had a VIF just over 4, the most conservative threshold; all other values were smaller than this, and thus we consider the data to be suitably non-multicollinear for regression analysis.

Results

Descriptive statistics

Table 1 describes the characteristics of the three groups.

Demographics

The AP-NP group was significantly older (U[83] = 341.5, Z = -3.48, p = 0.001) and had a significantly lower proportion of males than the AP-P group (χ^2[1, N=84] = 5.9, p = 0.15). The AP-NP group was also significantly older than the NC group (U[101] = 488.5, Z = -5.3, p = <0.001). There was no significant difference in gender between the AP-NP and NC

groups (χ^2[1, N=102] = 0.05, p = >0.05). There was no significant difference in age between the AP-P and NC groups (U[65] = 472.5, Z = -0.3, p = >0.05).

Table 1. Descriptive statistics. This table shows the means and standard deviations of the demographics and measures used in this study across the three study groups: autistic people with psychosis (AP-P), autistic people without psychosis (AP-NP), and neurotypical controls (NC).

Group	***AP-P***	***AP-NP***	***NC***
N	25	59	43
N male (%)	17 (68%)	26 (44%)	18 (42%)
Mean age (SD)	33.5 (11)	44.3 (12.8)	31.5 (9.2)
AQ mean (SD)	31 (9.9)	39 (8.2)	19.6 (9)
SPQ-BR total mean (SD)	77.6 (21.7)	71.8 (16.6)	52.6 (20.4)
SPQ-BR Positive mean (SD)	29.1 (13.4)	20.6 (9.2)	15.2 (9.4)
SPQ-BR Negative mean (SD)	26.8 (8.1)	28.4 (7.6)	19.5 (8.9)
SPQ-BR Disorganised (SD)	21.7 (4.7)	22.7 (6.1)	17.9 (7.2)
ALS-18 total mean (SD)	26 (10.8)	19.2 (13.3)	17.5 (12.7)
QCAE Perspective Taking mean (SD)	22.2 (6.7)	20.3 (7)	29.1 (5.7)
ERQ-9 Cognitive Reappraisal mean	19.7 (6.4)	22.3 (7)	22.1 (6.3)
ERQ-9 Emotion Suppression mean	17.3 (5.9)	16.3 (6.4)	14.7 (5.6)

N= number; SD = standard deviation; AQ = Autism Quotient; SPQ-BR = Schizotypal Personality Questionnaire – Brief Revised; ALS-18 = Affective Lability Scale – 18; QCAE = Questionnaire of Cognitive and Affective Empathy; ERQ-9 = Emotional Regulation Questionnaire – 9

AQ scores

Data from this study were compared with the result of a systematic review of total AQ scores across general population and clinical (autistic) samples (Ruzich et al., 2015) via z-test. Compared with the general population estimate by Ruzich and colleagues, the NC sample in this group scored significantly higher on the AQ (z = 3.12, p = 0.002). Compared to the clinical sample, the AP-P group scored significantly lower (z = -3.19, p = 0.001) and the AP-NP group scored significantly higher (z = 4.9, p <0.001). As a total group, the AP participants in this study scored significantly higher than the AQ clinical normative mean (z = 2.48, p = 0.01).

Within this study, the AP-P group scored significantly lower on the AQ than the AP-NP group (U[83] = 328.5, Z = -3.6, p = <0.001). Similarly, the NC group scored significantly lower than the AP-P group on the AQ (U[66] = 188, Z = -4.1, p = <0.001).

Subscale scores of the AQ were compared between the AP-P and AP-NP groups as unplanned comparisons, and so a Bonferroni-corrected significance level of p = 0.01 was adopted (0.05/5). Before correction, the AP-NP group scored higher in all subscales except for Attention to Detail, but after correction none of these results remained significant.

SPQ scores

Compared via single sample z-test to data from a normative population (A. S. Cohen et al., 2010), the NC group had significantly lower SPQ-BR Positive scores (z = -5.2, p<0.001), and significantly higher SPQ-BR Negative (z = 8.3, p<0.001) and SPQ-BR Disorganised (z = 4.1, p<0.001) scores. SPQ-BR normative scores are not available for an autistic sample.

Within this study, the AP-NP group scored higher than the NC group on total SPQ score (t[100]=5.2, p = <0.001). The AP-NP and AP-P groups did not differ significantly on total SPQ score (t[80]=-1.3, p = >0.05). The AP-P group reported significantly more positive

schizotypal traits than the AP-NP group (U[81] = 417.5, Z = -2.7, p = 0.007), but the two groups did not differ significantly in negative or disorganised schizotypal traits.

ALS-18 scores

Compared with a normative sample of 164 healthy controls (Look et al., 2010) (mean: 6.53, SD: 6), the NC in this sample had significantly higher total ALS scores (mean: 17.8, SD: 12.8) (z = 12, p<0.001). Normative data are not available on ALS-18 scores for AP.

The difference between total ALS-18 score for the AP-P and AP-NP groups approached significance in the expected direction (with the AP-P group reporting higher affective lability) (U[81] = 493, Z = -1.9, p = 0.055). Similar results were found for the *anxiety/depression* (U[81] = 519.5, Z = -1.7, p = 0.1) and *depression/elation* (U[81] = 500.5, Z = -1.8, p = 0.07) subscales of the ALS-18, with results in the expected direction but not reaching statistical significance. There was no significant difference in ALS total score between all AP and NC (U[124] = 1441.5, Z = -1.7, p = >0.05), nor on the *anxiety/depression* (U[124] = 1518, Z = -1.3, p = >0.05) or *depression/elation* (U[124] = 1582, Z = -0.9, p = >0.05) subscales.

QCAE

The NC group scored significantly higher than the combined AP group on QCAE *Perspective Taking*, as expected (U[124] = 620.5, Z = -5.9, p = <0.001). There was no significant difference between the AP-P and AP-NP groups (U[81] = 545, Z = -1.4, p = >0.05).

ERQ

There were no significant differences in ERQ styles between the AP-P and AP-NP groups. When the combined AP group was compared to NC, there was a non-significant trend towards greater use of emotional suppression by AP (U[124] = 1421.5, Z = -1.8, p = 0.08).

AQ SPQ Correlation Matrix

Table 2. Correlation matrix for the AQ and SPQ-BR. This table shows the correlations between subscales on the Autism Quotient (AQ) and the Schizotypal Personality Questionnaire – Brief Revised (SPQ-BR). It can be directly compared to the results reported by Dinsdale et al. (2013) for comparison with a neurotypical-only sample. Spearman's rho was used to calculate significance. * denotes statistical significance at the $p = 0.05$ level. ** denotes significance at the $p = 0.001$ level.

	Social	**Attention switching**	**Attention to detail**	**Communication**	**Imagination**	**AQ total**
Social anxiety	.647**	.721**	.404**	.612**	.473**	.685**
No close friends	.598**	.512**	.397**	.586**	.460**	.612**
Eccentric behaviour	.542**	.570**	.275**	.616**	.431**	.587**
Odd speech	.045	.134	.115	.262**	.240**	.189*
Magical thinking	-.017	.034	.158	.057	-.004	.051
Unusual Percep-tions	.132	.225*	.249**	.183*	.148	.219*
Ideas of reference	.313**	.398**	.284**	.386**	.292**	.399**
SPQ-BR total	.524**	.589**	.431**	.616**	.465**	.627**

A correlation matrix was produced to explore the relationship between subscales of the AQ and SPQ-BR and is shown in Table 2 above. All subscales showed multiple and at least moderate correlations between the two measures except for SPQ Magical thinking, which did not correlate significantly with any AQ subscale or the AQ total score.

Modelling factors affecting SPQ - Simple

Three linear regressions were calculated to predict SPQ-BR subscales (Positive, Negative, Disorganised) based on AQ total score, age, gender, and group (encoded by dummy variable with NC as the reference group), as well as the interactions between group and AQ total. In each case, the interaction was found to be non-significant and so was not included in the model. Table 3 shows the regression coefficients, confidence intervals (95%), and significance values for each of the three SPQ-BR scales, and these results are discussed in the subsections below.

Table 3. Regression coefficients, confidence intervals, and significance values for a simple model predicting Schizotypal Personality Questionnaire – Brief Revised (SPQ-BR) subscales using group membership, age, gender, and Autism Quotient (AQ) total scores.

	SPQ-BR Positive			***SPQ-BR Negative***			***SPQ-BR Disorganised***		
	β	CI (95%)	*p*	β	CI (95%)	*p*	β	CI (95%)	*p*
AP-P membership	10.32	4.64 – 16.01	**<0.001**	-0.34	-3.81 – 3.13	0.85	0.60	-2.78 – 3.97	0.73
AP-NP membership	-0.02	-5.81 – 5.77	0.99	-2.85	-6.39 – 0.68	0.11	-0.14	-3.57 – 3.30	0.94
AQ total	0.29	0.08 – 0.49	**0.006**	0.63	0.50 – 0.75	**<0.001**	0.27	0.15 – 0.39	**<0.001**
Age	-0.01	-0.17 – 0.15	0.90	-0.03	-0.13 – 0.07	0.55	-0.02	-0.12 – 0.07	0.63
Gender	1.10	-4.83 – 2.64	0.56	1.91	-4.19 – 0.36	0.10	-0.37	-2.58 – 1.84	0.74

SPQ Positive

AQ total (β = 0.29, *p*=0.006) and membership of the AP-P group (β = 10.32, *p* = <0.001) were the only significant predictors of SPQ Positive score. The overall model fit was r^2 = .24, which is a small-to-medium effect size (J. Cohen, 1988).

SPQ Negative

AQ total was the only significant predictor of SPQ Negative in this model (β = 0.62, *p*<0.001), and overall the model fit was r^2 = .57 which is a large effect size.

SPQ Disorganised

AQ total was the only significant predictor of SPQ Disorganised in this model (β = 0.27, *p*<0.001), and overall the model fit was r^2 = .24 which is a small-to-medium effect size.

Modelling factors affecting SPQ - Full

The above regressions were repeated for each SPQ subscale score using the five AQ subscale scores as predictors, as well as the total ALS score, strength of each ER style, and QCAE score, and are reported below.

SPQ Positive

ALS total score significantly predicted SPQ *Positive* (β = 0.43, *p*<0.001), as did ERQ emotional suppression (β = 0.27, *p*=0.05). No other predictors reached the 0.05 significance level, although there was a trend in both AQ *social* and AQ *attention to detail*.

Table 4. SPQ-BR Positive regression model with AQ subscales, affective lability, ER style, Perspective Taking, age, and gender as predictors. Significant predictors were ALS total and greater use of Emotional Suppression.

Predictor	*β*	*CI (95%)*	p-*value*
(Intercept)	-2.25	-16.92 – 12.41	0.76
AP-P	-3.88	-16.48– 8.71	0.55
AP-NP	5.09	-7.13 – 17.30	0.41
AQ Social	-0.83	-1.70 – 0.04	0.06
AQ Attention switching	-0.35	-1.49 – 0.79	0.55
AQ Attention to detail	0.67	-0.02 – 1.35	0.06
AQ Communication	0.52	-0.44 – 1.48	0.29
AQ Imagination	-0.18	-1.11 – 1.47	0.79
AP-P x Attention switching	0.98	-1.05 – 3.01	0.34
AP-NP x Attention switching	0.87	-0.83 – 2.56	0.32
AP-P x Imagination	1.22	-1.27 – 3.71	0.34
AP-NP x Imagination	-1.33	-2.88 – -0.22	0.09
ALS total	**0.43**	**0.30 – 0.56**	**<0.001**
Cognitive reappraisal	0.12	-0.12 – 0.36	0.34
Emotional suppression	**0.27**	**0.00 – 0.54**	**0.05**
QCAE Perspective Taking	0.05	-0.30 – 0.39	0.80
Age	0.04	-0.09 – 0.17	0.57
Gender	0.66	-2.50 – 3.81	0.68

SPQ Negative

Table 5. SPQ-BR Negative regression model with AQ subscales, affective lability, ER style, Perspective Taking, age, and gender as predictors. Significant predictors were AQ *attention switching*, AQ *communication*, ALS total, the ER style of *emotional suppression*, and QCAE *perspective taking*.

Predictor	*β*	*CI (95%)*	p-*value*
(Intercept)	7.02	-1.76 – 15.80	0.12
AP-P	3.79	-1.62 – 9.20	0.17
AP-NP	0.91	-4.75 – 6.58	0.75
AQ Social	0.48	-0.04 – 1.00	0.07
AQ Attention switching	**0.80**	**0.23 – 1.36**	**0.006**
AQ Attention to detail	0.18	-0.25 – 0.60	0.41
AQ Communication	**0.71**	**-0.01 – 1.43**	**0.05**
AQ Imagination	-0.33	-0.83 – 0.17	0.20
AP-P x communication	-0.74	-1.67 – 0.19	0.12
AP-NP x communication	-0.35	-1.22 – 0.51	0.43
ALS total	**0.08**	**0 – 0.15**	**0.05**
Cognitive reappraisal	0.11	-0.04 – 0.25	0.15
Emotional suppression	**0.55**	**0.39 – 0.72**	**<0.001**
QCAE Perspective Taking	**-0.22**	**-0.44 – -0.01**	**0.04**
Age	-0.02	-0.1 – 0.06	0.63
Gender	-0.07	-1.98 – 1.83	0.94

The AQ subscale relating to greater difficulties with *attention switching* significantly predicted SPQ *Negative* in the model (β = 0.8, *p*=0.006), as did AQ *communication* (β =

0.71, p=0.05). ALS total score (β = 0.08, p=0.05), the ER style of *emotional suppression* (β = 0.55, p<0.001), and QCAE *Perspective Taking* total (β = -0.22, p=0.04) were also significant predictors.

SPQ Disorganised

Table 6. SPQ-BR Disorganised regression model with AQ subscales, affective lability, ER style, Perspective Taking, age, and gender as predictors. Significant predictors were AQ *communication* and ALS total.

Predictor	*β*	*CI (95%)*	p-*value*
(Intercept)	10.95	1.71 – 20.19	0.02
AP-P	-0.30	-3.23 – 2.62	0.84
AP-NP	0.27	-2.82 – 3.37	0.86
AQ Social	-0.41	-0.98 – 0.15	0.15
AQ Attention switching	0.11	-0.49 – 0.71	0.72
AQ Attention to detail	-0.18	-0.63 – 0.27	0.43
AQ Communication	**1.2**	**0.58 – 1.83**	**<0.001**
AQ Imagination	0.25	-0.28 – 0.79	0.35
ALS total	**0.16**	**0.08 – 0.25**	**<0.001**
Cognitive reappraisal	0.06	-0.1 – 0.21	0.46
Emotional suppression	-0.08	-0.265– 0.1	0.39
QCAE Perspective Taking	0.03	-0.19 – 0.26	0.77
Age	-0.01	-0.09 – 0.08	0.88
Gender	1.16	-0.84 – 3.17	0.26

The AQ subscale relating to greater difficulties with communication significantly predicted SPQ Disorganised symptoms in the model (β = 1.19, p<0.001), along with ALS total score (β = 0.17, p<0.001).

Logistic Regression of AP Group Membership

A logistic regression was completed to determine which variables significantly predicted membership of ASD group (AP-P or AP-NP). The variables included were AQ total, ALS total, Emotional Suppression, Cognitive Reappraisal, QCAE score, gender, and age. Table 7 below shows the results of the logistic regression. Overall, the model was a moderately good fit, with a Nagelkirk r^2 value of 0.53.

The two significant predictors in the model were AQ total (β= -0.2, p = 0.004) and ASL total (β= 0.09, p = 0.01). AQ total was lower in the AP-P group and ALS total was higher in the AP-P group.

Table 7. Logistic regression of autism group membership (-psychosis or –no psychosis). This model had reasonable fit and significant predictors of group membership were AQ total and ALS total.

Predictor	*β*	*Wald*	p-*value*
AQ total	**-0.2**	**8.22**	**0.004**
ALS total	**0.09**	**6.43**	**0.01**
ERQ Emotional Suppression	0.07	0.94	0.33
ERQ Cognitive Reappraisal	-0.01	0.01	0.92
QCAE Perspective Taking	-0.1	1.41	0.24
Gender	0.93	1.71	0.19
Age	-0.06	3.64	0.06

Affective Differences in ASD Groups

Table 8. Results of one-way analysis of variance comparing affective lability subscales between AP-P and AP-NP groups. None of these comparisons was significant, although the Depression/Elation and Anxiety/Depression comparisons trended towards significance with small-to-medium effect sizes.

Subscale	***F-statistic***	**p-*value***	***AP-P mean (SD)***	***AP-NP mean (SD)***	η^2
Depression/Elation	3.78	0.06	11.87 (4.93)	8.92 (6.6)	0.045
Anxiety/Depression	3.5	0.06	8.35 (4.34)	6.32 (4.35)	0.043
Anger	3.09	0.08	5.74 (4.25)	2.92 (4.21)	0.037

Differences in the ALS Depression/Elation, Anxiety/Depression, and Anger subscales were tested between the AP-P and AP-NP groups using one-way ANOVA. No significant differences were found on any of the subscales (see Table 8 for full details), but results of Depression/Elation and Anxiety/Depression trended towards significance in the predicted

direction. All group means were higher for the AP-P group than for the AP-NP group and effect sizes for the two trending scales were small-to-medium.

Discussion

This study set out to test several hypotheses regarding the relationship between schizotypal and autistic traits, and their relationship to affective lability, emotion regulation style, and cognitive affective empathy. These hypotheses will be restated here and discussed in relationship to the results reported above.

AP will have higher rates of both schizotypal and autistic traits compared with neurotypical controls

The results of this study support this hypothesis despite unusually high levels of autistic and schizotypal traits in the NC group. In line with previous research, the AP in this sample had significantly higher rates of autistic traits, as measured by the AQ, and schizotypal traits, as measured by the SPQ-BR, than NC. However, it is interesting to note that the AP-P group had lower AQ scores than the AP-NP group. This might be predicted, based on the finding that the autistic traits were lower in an AP-P population when the Autism Diagnostic Interview- Revised (Lord, Rutter, & Le Couteur, 1994) was used to measure them (Larson et al., 2017). Similar to the conclusions drawn in that research, we would posit that it is possible that AP who develop psychosis may represent a distinct subset of AP in terms of their autistic features. This provides support for a multiple overlapping aetiologies model of the relationship between ASD and psychosis, which Chisholm and colleagues (2015)pointed out could be defined by subgroups in both the autistic and psychotic populations.

Schizotypal traits will be higher in AP with a history of psychosis (AP-P) compared with AP who have no history of psychosis (AP-NP)

Overall in AP, schizotypal traits were higher than in NC, similar to the conclusions found in previous research (Barneveld et al., 2011; Spek & Wouters, 2010). However, there was no significant difference in overall SPQ-BR score between AP-P and AP-NP. Detailed analysis showed that AQ was a significant predictor of each of the SPQ-BR subscale scores, in line with previous research on the overlap between the two scales (Dinsdale et al., 2013; Ford & Crewther, 2014). AP-P group membership was significantly predicted by SPQ-BR Positive traits. Thus, there is partial support for this hypothesis, but only with respect to positive schizotypal traits.

AP-P will have higher rates of non-helpful ER strategies than AP-NP and will also have higher overall rates of affective lability

The ER strategies used by AP-P and AP-NP did not differ significantly, and AP in general did not different significantly from NC in use of these strategies either. There was a trend that failed to reach significance for greater overall affective lability in the AP-P group compared to AP-NP, but interestingly AP as a whole did not different significantly from NC on self-reported affective lability. However, when entered into a logistic regression model, affective lability did significantly predict AP-P group membership. Thus, there is partial support for this hypothesis but the analysis may have been underpowered to adequately measure a subtle effect of affective lability.

AP-P will have higher perspective taking scores than AP-NP

There was no clear support for this hypothesis, which was designed to test the concept of empathising as a diametrical concept differentiating autism and psychosis. We only tested a limited type of empathising, but one that is central to the arguments made by Brosnan and

colleagues (Brosnan, Ashwin, & Gamble, 2013; Brosnan et al., 2010) regarding the link between the autistic traits and psychosis. The relationship between perspective taking and other factors, such as ER, is likely to complicate this picture (Lockwood, Seara-Cardoso, & Viding, 2014), and our analysis did not investigate this complexity as this was outside the scope of the study. However, in line with the extreme male brain theory of autism (Baron-Cohen, 2002), AP as a total group scored significantly lower on perspective taking than NC when controlling for other factors. In addition, lower perspective taking predicted SPQ-BR *Negative* traits, supporting a link between negative schizotypal traits and autistic traits via the mediator of empathy (particularly perspective taking). Lower empathy is associated with lower *agreeableness* scores and less prosocial behaviour (Graziano, Habashi, Sheese, & Tobin, 2007). It is interesting to consider this in light of Ford and Crewther's (2014) *social rigidity* scale, which combines elements of autism and schizotypy. A social rigid person could be hypothesised to have lower empathy and to engage in fewer prosocial behaviours. Considering the impact of this on their social relationships seems important when considering factors associated with the development of serious mental health problems such as psychosis (Michaels et al., 2014), but is beyond the scope of the current study.

Higher ER difficulties and affective lability will be associated with higher schizotypal scores across participant groups

Affective lability, as measured by ALS-18 total score, significantly predicted all three subscales of the SPQ-BR. It appeared to moderate the association between autistic traits and schizotypal traits, as although AQ total score was a significant predictor of SPQ-BR subscale scores in a simple model, no single AQ subscale was a consistent predictor in a more detailed model that included affective lability.

The SPQ Positive regression results are particularly interesting in this regard as it was the only regression where AP group interacted with AQ subscales significantly. Those in the

AP-P group were more affected by difficulties attention switching linked to increased SPQ Positive traits, while attention to detail was significantly predictive of less positive schizotypy in the AP-NP group. It is interesting to consider how these three factors, increased attention to detail, increased difficulty attention switching, and more affective lability, might represent a specific, moderated vulnerability to positive schizotypy. The results may indicate that affectively labile individuals who have difficulty attention-switching and are less perceptive of detail in their environment may be at greater risk of positive schizotypal experiences and possibly psychosis. However, this is a very tentative speculation as it is impossible to infer causality from these data.

Negative schizotypal traits were also predicted in interesting ways, beyond simply the affective lability total score. Difficulty attention switching, poorer perspective taking, and reliance on emotional suppression as an ER strategy combined with greater affective lability to predict negative schizotypal traits in this model.

Disorganised schizotypal traits were predicted by affective lability and communication difficulties measured by the AQ. Interestingly, additional post hoc analysis revealed that it was SPQ-BR *eccentric behaviour* that strongly predicted AQ *communication*, rather than the SPQ-BR *odd speech* as one might predict. A link between AQ *social difficulties* and SPQ-BR *eccentric behaviour* was not suggested by the models. Thus, perhaps AP who find communication particularly difficult are more likely to behave in ways that are viewed as not socially conformative and appear odd and unusual, despite how they might self-report their social skill level.

Thus, while affective lability is the thread that runs consistently through the schizotypal subscales as a predictor, the particular nuances of the difficulty associated with each schizotypal trait are mediated by other predictors in each case. It is also impossible to

state whether affective lability proceeds or develops as a result of other difficulties, as no prospective studies have been carried out investigating this.

ER style (emotional suppression) only significantly predicted negative schizotypal traits. Thus, this part of the hypothesis is only partially supported.

Summary

This study set out to investigate the relationship between autistic traits and schizotypal traits in a mixed group of AP and NC. While this is an area that has been researched before, the results presented here add to the evidence base by including a group of individuals who are dually affected by autism and psychosis, and by considering a number of factors together in the same analysis. Our results support those of Spek and Wouters (Spek & Wouters, 2010) in finding that AP who have experienced psychosis score higher on the Positive subscale of the SPQ compared to AP with no history of psychosis – essentially, history of psychosis appears to be predicted by positive schizotypal traits regardless of level of autistic traits. Affective lability also seems to have a significant effect in predicting all types of schizotypal traits, although this relationship can be complex and moderated through specific autistic traits.

Previous literature such as Dinsdale and colleagues' work (2013) suggested that the Negative and Disorganised subscales of the SPQ-BR were more highly correlated across AQ subscales than the Positive subscale, in a neurotypical sample. In the current study, AQ total had the strongest predictive effect for SPQ Negative traits, replicating and supporting the idea that this is the largest area of overlap between the two concepts. Although we did find that the AQ total score was predictive of all schizotypal subscales, replicating Dinsdale et al. (2013), when other predictors were entered into the model we found AQ subscales to be less useful in predicting SPQ scores.

There were no significant effects of ER style on schizotypal traits except an association between emotional suppression and negative schizotypy. This is an interesting

finding that seems to make intuitive sense, but may warrant further investigation in clinical and non-clinical samples. Perspective taking also did not seem to be a significant mediator of the relationship between AQ and SPQ-BR scores, except in the case of negative schizotypy. This seems best explained by the evidence showing a link between AQ and negative schizotypy (e.g. Dinsdale et al., 2013). However, this is a complex area with potential links to Ford and Crewther's (2014) *social rigidity* factor, and further research would be needed to examine the subtleties of these constructs. There is no clear evidence from these results that psychosis associates with greater empathising ability in AP.

Limitations

The most obvious and significant limitation is the small size of the AP-P subgroup. Attempts were made to overcome this by limiting the number of analyses dependent on this group individually, and instead focussing on the relationship between the different variables in the wider group. However, it is likely that the AP-P group was not representative of AP who have experienced psychosis, and also that the study would have been underpowered to detect differences in this group.

There was also a significant age difference in the AP-NP group. It is known that affective lability generally decreases with age (Lawton, Kleban, Rajagopal, & Dean, 1992), and thus this age difference may have affected findings related to affective lability. However, age was included in the models, so it is believed that this interaction between age and affective lability was likely to have been accounted for in the statistical calculations presented. It is acknowledged that this may have removed real group differences from the model, and it would be important for future studies to carefully age-match participants when considering affective lability as a predictor variable.

It would have been ideal to examine the validity of Ford and Crewther's (2014) three factors in the current data set, but this was not possible as they utilised the full SPQ and the

current study used a short form of that measure. It is possible that the three factors may be a better way of understanding the data presented here, and future studies should consider using more diverse clinical groups to examine the effect of the three factors as well as SPQ and AQ scores alone.

The representativeness of the individuals in each of the groups studied here is also likely to be a limitation, particularly the NC group. By treating the constructs predictors, rather than making strict comparisons between groups, it is hoped that this problem may have been attenuated somewhat. However, the generalisability of these results could reasonably be questioned and further research with larger and/or more representative samples should be undertaken.

Conclusions and future directions

Despite these limitations, these findings broadly support previous findings regarding a relationship between schizotypal and autistic traits. However, this relationship is known to be complex, and findings differ between studies. Using a unique clinical sample of AP who have experienced psychosis, the current results hint at affective lability being an important and poorly understood factor related to level of schizotypy. There may be a group of AP who are particularly vulnerable to schizotypy/psychosis, characterised by slightly lower autistic traits but more affective lability and difficulty with attention switching. It is intriguing to consider what the experiences of a group of people who are less obviously different from neurotypicals might be, and how this might impact on their mental health. As a group, these individuals may be better at "passing" in neurotypical society but also experience greater awareness of their own difference, which would in itself be potentially stressful. This may be an important factor when considering a stress-vulnerability model of susceptibility to psychotic illness (Nuechterlein & Dawson, 1984). Further research is needed in this area with larger samples of AP. Particuarly important might be prospective studies, tracking changes in

autistic traits over time while monitoring for mental health problems that might emerge. Anecdotal evidence from clinicians provides support for the idea that there may be an under-served group of intellectually able AP whose struggles may be more hidden and whom services might find more difficult to help as a result of their hidden disabilities. These ideas, combined with the research data on rates of mental health problems in AP summarised in the introduction, and the results of this study and Larson et al. (2017) indicate this should be a priority in autism research.

This is partly because affective lability and ER provide important clinical targets, particularly for psychological intervention. While it is unknown whether affective lability is a vulnerability factor or a consequence of severe mental illness, it is clearly important and linked to schizotypal traits by the current research. There are a number of interventions that have been shown to positively impact ER ability, such as mindfulness-based interventions (Deckersbach et al., 2012; Hill & Updegraff, 2012). Dialectical behavioural therapy (DBT) (Linehan et al., 1991) has been used in the treatment of borderline personality disorder (BPD), and specifically targets ER as part of treatment by teaching skills to increase ER abilities. An adaptation to DBT has been described to make it suitable for use with AP (Hartmann, Urbano, Manser, & Okwara, 2012) but no clinical trials have been conducted to date and there is little published in this area.

Thus, it is hoped that the results of this research might have two effects. The first would be to encourage the inclusion of affective lability and ER in future studies of the relationship between schizotypal and autistic traits. The replication of our results on a larger scale in a general population sample is an obvious next step in research in this area. Further research in dually-affected populations would also be important, as there is a dearth of this in currently published research. The second effect would be for clinical work with AP who experience mental health problems to consider affective lability and ER as possible risk and

maintaining factors. It may be that our findings encourage clinical trials of ER-based therapies with AP, but a more likely outcome would be that individual clinicians working with AP may gain benefit from prioritising this dimension of psychological difficulty in their work. Such an approach requires psychological, rather than medical, solutions and clinical psychologists in particular may benefit from considering ER difficulties in their formulations of client difficulties when those clients are also autistic.

It is also important to recognise the negative impact of low levels of empathising on social functioning, as it might apply to AP. Approaches such as social skills training (Williams White, Keonig, & Scahill, 2007) may be important in reducing *social rigidity* in AP, and may have the effect of reducing stress experienced by this group. In the context of the stress-vulnerability model of psychosis (Nuechterlein & Dawson, 1984), this is a clear possible path towards reducing rates of psychosis in AP, but further research is required. It is also important to acknowledge that this work should be done sensitively, as it maintains the implicit bias that the neurotypical way of being is the preferential way of being. A more radical intervention would be to reduce the stress experienced by AP by changing how society responds to them and values them. This is an area where we have already seen much change in the last 30 years or so in terms of perceptions of AP, but much more work remains to be done to ensure they are included and valued in society. While this is clearly preferable in terms of acknowledging the positives of neurodiversity and destigmatising difference, it may be more pragmatic and ultimately more helpful for individual AP in the short-term to be able to learn to adapt to the challenges they face by virtue of differing in fundamental ways for much of the population. Parallels may be drawn from the history of disability rights movements, and current conceptualisations of disability/difference now encompass those with “invisible” disabilities such as ASD (Rice, Chandler, Harrison, Liddiard, & Ferrari, 2015).

References

Aas, M., Aminoff, S. R., Vik Lagerberg, T., Etain, B., Agartz, I., Andreassen, O. a, & Melle, I. (2014). Affective lability in patients with bipolar disorders is associated with high levels of childhood trauma. *Psychiatry Research*, *218*(1–2), 252–5. http://doi.org/10.1016/j.psychres.2014.03.046

Aas, M., Pedersen, G., Henry, C., Bjella, T., Bellivier, F., Leboyer, M., … Etain, B. (2015). Psychometric properties of the Affective Lability Scale (54 and 18-item version) in patients with bipolar disorder, first-degree relatives, and healthy controls. *Journal of Affective Disorders*, *172*, 375–380. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/25451440

Akiskal, H. S., Akiskal, K. K., Haykal, R. F., Manning, J. S., & Connor, P. D. (2005). TEMPS-A: progress towards validation of a self-rated clinical version of the Temperament Evaluation of the Memphis, Pisa, Paris, and San Diego Autoquestionnaire. *Journal of Affective Disorders*, *85*(1–2), 3–16. http://doi.org/10.1016/j.jad.2004.12.001

Akiskal, H. S., Akiskal, K. K., Perugi, G., Toni, C., Ruffolo, G., & Tusini, G. (2006). Bipolar II and anxious reactive "comorbidity": Toward better phenotypic characterization suitable for genotyping. *Journal of Affective Disorders*, *96*(3), 239–247. http://doi.org/10.1016/j.jad.2006.08.010

Akiskal, H. S., Kilzieh, N., Maser, J. D., Clayton, P. J., Schettler, P. J., Traci Shea, M., … Keller, M. B. (2006). The distinct temperament profiles of bipolar I, bipolar II and unipolar patients. *Journal of Affective Disorders*, *92*(1), 19–33. http://doi.org/10.1016/j.jad.2005.12.033

Akiskal, H. S., Maser, J. D., Zeller, P. J., Endicott, J., Coryell, W., Keller, M., … Goodwin, F. (1995). Switching from "unipolar" to bipolar II. An 11-year prospective study of clinical and temperamental predictors in 559 patients. *Archives of General Psychiatry*, *52*(2), 114–23. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7848047

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237. http://doi.org/10.1016/j.cpr.2009.11.004

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, Virginia: American Psychiatric Publishing.

Aminoff, S. R., Jensen, J., Lagerberg, T. V., Hellvin, T., Sundet, K., Andreassen, O. A., & Melle, I. (2012). An association between affective lability and executive functioning in bipolar disorder. *Psychiatry Research*, *198*(1), 58–61. http://doi.org/10.1016/j.psychres.2011.12.044

Atzeni, T., Henry, C., Minois, I., Gard, S., Desage, A., Zanouy, L., & M'Bailara, K. (2013). From inhibition to activation, from emotional hyporeactivity to emotional hyperreactivity: Two pathways to discriminate mood in bipolar disorders. *Psychiatry Research*, *209*(1), 50–54. http://doi.org/10.1016/j.psychres.2012.10.008

Barneveld, P. S., Pieterse, J., de Sonneville, L., van Rijn, S., Lahuis, B., van Engeland, H., & Swaab, H. (2011). Overlap of autistic and schizotypal traits in adolescents with Autism Spectrum Disorders. *Schizophrenia Research*, *126*(1–3), 231–236. http://doi.org/10.1016/j.schres.2010.09.004

Baron-Cohen, S. (2002). The extreme male brain theory of autism. *TRENDS in Cognitive Sciences*, *6*(6), 248–254.

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/High-Functioning Autism, Malesand Females, Scientists and Mathematicians. *Journal of Autism and*

Developmental Disorders, *31*(1), 5–17. http://doi.org/10.1023/a:1005653411471
Becerra, R., Cruise, K., Murray, G., Bassett, D., Harms, C., Allan, A., & Hood, S. (2013). Emotion regulation in bipolar disorder : Are emotion regulation abilities less compromised in euthymic bipolar disorder than unipolar depressive or anxiety disorders ? *Open Journal of Psychiatry*, *3*(4a), 1–7.
Benazzi, F. (2004a). Inter-episode mood lability in mood disorders: Residual symptom or natural course of illness? *Psychiatry and Clinical Neurosciences*, *58*, 480–486. http://doi.org/10.1111/j.1440-1819.2004.01289.x
Benazzi, F. (2004b). Validating Angst's "ups & downs" personality trait as a new marker of bipolar II disorder. *European Archives of Psychiatry and Clinical Neuroscience*, *254*(1), 48–54. http://doi.org/10.1007/s00406-004-0455-8
Benazzi, F., & Akiskal, H. S. (2005). A downscaled practical measure of mood lability as a screening tool for bipolar II. *Journal of Affective Disorders*, *84*(2–3), 225–32. http://doi.org/10.1016/j.jad.2003.09.010
Bowen, R., Block, G., & Baetz, M. (2008). Mood and Attention Variability in Women with Alcohol Dependence: A Preliminary Investigation. *American Journal on Addictions*, *17*(1), 77–81. http://doi.org/10.1080/10550490701756013
Brosnan, M., Ashwin, C., & Gamble, T. (2013). Greater Empathizing and reduced Systemizing in people who show a jumping to conclusions bias in the general population: Implications for psychosis. *Psychosis*, *5*(1), 71–81.
Brosnan, M., Ashwin, C., Walker, I., & Donaghue, J. (2010). Can an "Extreme Female Brain" be characterised in terms of psychosis? *Personality and Individual Differences*, *49*, 738–742.
Brown, T. a, & Barlow, D. H. (2005). Dimensional versus categorical classification of mental disorders in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders and beyond: comment on the special section. *Journal of Abnormal Psychology*, *114*(4), 551–556. http://doi.org/10.1037/0021-843X.114.4.551
Burbach, J. P. H., & van der Zwaag, B. (2009). Contact in the genetics of autism and schizophrenia. *Trends in Neurosciences*, *32*(2), 69–72.
Calkins, S. D., & Hill, A. (2007). Caregiver influences on emerging emotion regulation: Biological and environmental transactions in early development. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 229–248). London: Guilford Press.
Callaway, D. A., Cohen, A. S., Matthews, R. A., & Dinzeo, T. J. (2014). Schizotypal Personality Questionnaire-Brief Revised: psychometric replication and extension. *Personality Disorders*, *5*(1), 32–8. http://doi.org/10.1037/per0000041
Caseras, X., Murphy, K., Lawrence, N. S., Fuentes-Claramonte, P., Watts, J., Jones, D. K., & Phillips, M. L. (2015). Emotion regulation deficits in euthymic bipolar I versus bipolar II disorder: a functional and diffusion-tensor imaging study. *Bipolar Disorders*, (3), 1–10. http://doi.org/10.1111/bdi.12292
Castle, D. J., Jablensky, A., McGrath, J. J., Carr, V., Morgan, V., Waterreus, A., … Farmer, A. (2006). The diagnostic interview for psychoses (DIP): development, reliability and applications. *Psychological Medicine*, *36*, 69–80.
Cederlund, M., Hagberg, B., Billsted, E., Gillberg, I. C., & Gillberg, C. (2008). Asperger syndrome and autism: a comparative longitudinal follow-up study more than 5 years after original diagnosis. *Journal of Autism and Developmental Disorders*, *38*, 72–85.
Chisholm, K., Lin, A., Abu-Akel, A., & Wood, S. J. (2015). The association between autism and schizophrenia spectrum disorders: A review of eight alternate models of co-occurrence. *Neuroscience and Biobehavioral Reviews*, *55*, 173–183. http://doi.org/10.1016/j.neubiorev.2015.04.012
Cohen, A. S., Matthews, R. a, Najolia, G. M., & Brown, L. a. (2010). Toward a more

psychometrically sound brief measure of schizotypal traits: introducing the SPQ-Brief Revised. *Journal of Personality Disorders*, *24*(4), 516–537. http://doi.org/10.1521/pedi.2010.24.4.516

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cooper, S.-A., Smiley, E., Morrison, J., Williamson, A., & Allan, L. (2006). Mental ill-health in adults with intellectual disabilities: prevalence and associated factors. *The British Journal of Psychiatry*, *190*(1), 27–35.

Corbalán, F., Beaulieu, S., & Armony, J. L. (2015). Emotion regulation in bipolar disorder type I: an fMRI study. *Psychological Medicine*, 1–11. http://doi.org/10.1017/S0033291715000434

Coulston, C. M., Tanious, M., Mulder, R. T., Porter, R. J., & Malhi, G. S. (2012). Bordering on bipolar: the overlap between borderline personality and bipolarity. *The Australian and New Zealand Journal of Psychiatry*, *46*(6), 506–21. http://doi.org/10.1177/0004867412445528

Couture, S. M., Penn, D. L., Losh, M., Adolphs, R., Hurley, R., & Piven, J. (2010). Comparison of social cognitive functioning in schizophrenia and high functioning autism: more convergence than divergence. *Psychological Medicine*, *40*(4), 569–579. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827676/

Craddock, N., & Owen, M. J. (2010). The Kraepelinian dichotomy - going, going... but still not gone. *Br J Psychiatry*, *196*(2), 92–95. http://doi.org/196/2/92 [pii]10.1192/bjp.bp.109.073429

Crespi, B., & Badcock, C. (2008). Psychosis and autism as diametrical disorders of the social brain. *Behavioral and Brain Sciences*, *31*, 241–261.

Cuellar, A. K., Johnson, S. L., & Ruggero, C. J. (2009). Affective reactivity in response to criticism in remitted bipolar disorder: a laboratory analog of Expressed Emotion. *Journal of Clinical Psychology*, *65*(9), 925–41. http://doi.org/10.1002/jclp.20596

Dakin, S., & Frith, U. (2005). Vagaries of visual perception in autism. *Neuron*, *48*(3), 497–507. http://doi.org/10.1016/j.neuron.2005.10.018

Das, P., Calhoun, V., & Malhi, G. S. (2014). Bipolar and borderline patients display differential patterns of functional connectivity among resting state networks. *NeuroImage*, *98*, 73–81. http://doi.org/10.1016/j.neuroimage.2014.04.062

Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A., & Liaw, J. (2004). Early social attention impairments in autism: social orienting, joint attention, and attention to distress. *Developmental Psychology*, *40*(2), 271–283. http://doi.org/10.1037/0012-1649.40.2.271

de Lacy, N., & King, B. H. (2013). Revisiting the Relationship Between Autism and Schizophrenia: Toward an Integrated Neurobiology. *Annual Review of Clinical Psychology*, *9*, 555–587.

Deckersbach, T., Hölzel, B. K., Eisner, L. R., Stange, J. P., Peckham, A. D., Dougherty, D. D., … Nierenberg, A. a. (2012). Mindfulness-based cognitive therapy for nonremitted patients with bipolar disorder. *CNS Neuroscience & Therapeutics*, *18*(2), 133–41. http://doi.org/10.1111/j.1755-5949.2011.00236.x

Deckersbach, T., Sl, R., Buhlmann, U., Ostacher, M., Beucke, J.-C., Nierenberg, A., … Dougherty, D. (2008). An fMRI investigation of working memory and sadness in females with bipolar disorder : a brief report. *Bipolar DIsorders*, *10*(20), 928–942. http://doi.org/10.1111/j.1399-5618.2008.00633.x

Dickstein, D. P., & Leibenluft, E. (2006). Emotion regulation in children and adolescents: boundaries between normalcy and bipolar disorder. *Development and Psychopathology*, *18*(4), 1105–31. http://doi.org/10.1017/S0954579406060536

Dinsdale, N. L., Hurd, P. L., Wakabayashi, A., Elliot, M., & Crespi, B. J. (2013). How are autism and schizotypy related? Evidence from a non-clinical population. *PloS One*, *8*(5), e63316. http://doi.org/10.1371/journal.pone.0063316

Edge, M. D., Lwi, S. J., & Johnson, S. L. (2014). An Assessment of Emotional Reactivity to Frustration of Goal Pursuit in Euthymic Bipolar I Disorder. *Clinical Psychological Science*, *3*(6), 940–955. http://doi.org/10.1177/2167702614555412

Eich, D., Gamma, A., Malti, T., Vogt Wehrli, M., Liebrenz, M., Seifritz, E., & Modestin, J. (2014). Temperamental differences between bipolar disorder, borderline personality disorder, and attention deficit/hyperactivity disorder: Some implications for their diagnostic validity. *Journal of Affective Disorders*, *169*, 101–104. http://doi.org/10.1016/j.jad.2014.05.028

Esterberg, M. L., Ousley, O. Y., Cubells, J. F., & Walker, E. F. (2013). Prodromal and autistic symptoms in schizotypal personality disorder and 22q11.2 deletion syndrome. *Journal of Abnormal Psychology*, *122*(1), 238–49. http://doi.org/10.1037/a0028373

Esterberg, M. L., Trotman, H. D., Brasfield, J. L., Compton, M. T., & Walker, E. F. (2008). Childhood and current autistic features in adolescents with schizotypal personality disorder. *Schizophrenia Research*, *104*(1–3), 265–73. http://doi.org/10.1016/j.schres.2008.04.029

Favre, P., Polosan, M., Pichat, C., Bougerol, T., & Baciu, M. (2015). Cerebral Correlates of Abnormal Emotion Conflict Processing in Euthymic Bipolar Patients: A Functional MRI Study. *PLoS One*, *10*(8), e0134961. http://doi.org/10.1371/journal.pone.0134961

Feldman, G. C., Joormann, J., & Johnson, S. L. (2008). Responses to Positive Affect: A Self-Report Measure of Rumination and Dampening. *Cognitive Therapy and Research*, *32*(4), 507–525. http://doi.org/10.1007/s10608-006-9083-0

Fletcher, K., Parker, G. B., & Manicavasagar, V. (2013). Coping profiles in bipolar disorder. *Comprehensive Psychiatry*, *54*(8), 1177–84. http://doi.org/10.1016/j.comppsych.2013.05.011

Fletcher, K., Parker, G., Bayes, A., Paterson, A., & McClure, G. (2014). Emotion regulation strategies in bipolar II disorder and borderline personality disorder: differences and relationships with perceived parental style. *Journal of Affective Disorders*, *157*, 52–9. http://doi.org/10.1016/j.jad.2014.01.001

Ford, T. C., & Crewther, D. P. (2014). Factor Analysis Demonstrates a Common Schizoidal Phenotype within Autistic and Schizotypal Tendency: Implications for Neuroscientific Studies. *Frontiers in Psychiatry*, *5*(August), 117. http://doi.org/10.3389/fpsyt.2014.00117

Garnefski, N., & Kraaij, V. (2007). The Cognitive Emotion Regulation Questionnaire. *European Journal of Psychological Assessment*, *23*(3), 141–149. http://doi.org/10.1027/1015-5759.23.3.141

Geschwind, D. H., & Levitt, P. (2007). Autism spectrum disorders: developmental disconnection syndromes. *Current Opinion in Neurobiology*, *17*(1), 103–111.

Ghaznavi, S., & Deckersbach, T. (2012). Rumination in bipolar disorder: evidence for an unquiet mind. *Biology of Mood & Anxiety Disorders*, *2*(1), 2. http://doi.org/10.1186/2045-5380-2-2

Gilbert, K. E., Nolen-Hoeksema, S., & Gruber, J. (2013). Positive emotion dysregulation across mood disorders: how amplifying versus dampening predicts emotional reactivity and illness course. *Behaviour Research and Therapy*, *51*(11), 736–41. http://doi.org/10.1016/j.brat.2013.08.004

Gilbert, K., & Gruber, J. (2014). Emotion Regulation of Goals in Bipolar Disorder and Major Depression: A Comparison of Rumination and Mindfulness. *Cognitive Therapy and Research*, *38*(4), 375–388. http://doi.org/10.1007/s10608-014-9602-3

Grande, I., Berk, M., Birmaher, B., & Vieta, E. (2016). Bipolar disorder. *The Lancet*, *387*(10027), 1561–1572. http://doi.org/10.1016/S0140-6736(15)00241-X

Grant, B. F., Chou, S. P., Goldstein, R. B., Huang, B., Stinson, F. S., Saha, T. D., … Ruan, W. J. (2008). Prevalence, correlates, disability, and comorbidity of DSM-IV borderline personality disorder: results from the Wave 2 National Epidemiologic Survey on Alcohol and Related Conditions. *The Journal of Clinical Psychiatry*, *69*(4), 533–45. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/18426259

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation. *Journal of Psychopathology and Behavioral Assessment*, *26*(1), 41–54. http://doi.org/10.1023/B:JOBA.0000007455.08539.94

Graziano, W. G., Habashi, M. M., Sheese, B. E., & Tobin, R. M. (2007). Agreeableness, empathy, and helping: A person × situation perspective. *Journal of Personality and Social Psychology*, *93*(4), 583–599. http://doi.org/10.1037/0022-3514.93.4.583

Green, M. J., Cahill, C. M., & Malhi, G. S. (2007). The cognitive and neurophysiological basis of emotion dysregulation in bipolar disorder. *Journal of Affective Disorders*, *103*(1–3), 29–42. http://doi.org/10.1016/j.jad.2007.01.024

Green, M. J., Lino, B. J., Hwang, E.-J., Sparks, A., James, C., & Mitchell, P. B. (2011). Cognitive regulation of emotion in bipolar I disorder and unaffected biological relatives. *Acta Psychiatrica Scandinavica*, *124*(4), 307–16. http://doi.org/10.1111/j.1600-0447.2011.01718.x

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, *85*(2), 348–362. http://doi.org/10.1037/0022-3514.85.2.348

Gruber, J., Eidelman, P., & Harvey, A. G. (2008). Transdiagnostic emotion regulation processes in bipolar disorder and insomnia. *Behaviour Research and Therapy*, *46*(9), 1096–100. http://doi.org/10.1016/j.brat.2008.05.004

Gruber, J., Eidelman, P., Johnson, S. L., Smith, B., & Harvey, A. G. (2011). Hooked on a feeling: Rumination about positive and negative emotion in inter-episode bipolar disorder. *Journal of Abnormal Psychology*, *120*(4), 956–961.

Gruber, J., Harvey, A. G., & Gross, J. J. (2012). When trying is not enough: emotion regulation and the effort-success gap in bipolar disorder. *Emotion (Washington, D.C.)*, *12*(5), 997–1003. http://doi.org/10.1037/a0026822

Gruber, J., Harvey, A. G., & Purcell, A. (2011). What goes up can come down? A preliminary investigation of emotion reactivity and emotion recovery in bipolar disorder. *Journal of Affective Disorders*, *133*(3), 457–66. http://doi.org/10.1016/j.jad.2011.05.009

Gruber, J., Hay, A. C., & Gross, J. J. (2014). Rethinking emotion: cognitive reappraisal is an effective positive and negative emotion regulation strategy in bipolar disorder. *Emotion (Washington, D.C.)*, *14*(2), 388–96. http://doi.org/10.1037/a0035249

Gruber, J., Kogan, A., Mennin, D., & Murray, G. (2013). Real-world emotion? An experience-sampling approach to emotion experience and regulation in bipolar I disorder. *Journal of Abnormal Psychology*, *122*(4), 971–83. http://doi.org/10.1037/a0034425

Gul, A., & Khan, K. (2014). Emotion regulation strategies can predict task-switching abilities in euthymic bipolar patients. *Frontiers in Human Neuroscience*, *8*(October), 847. http://doi.org/10.3389/fnhum.2014.00847

Hartmann, K., Urbano, M., Manser, K., & Okwara, L. (2012). Modified Dialectical Behavior Therapy to Improve Emotion Regulation in Autism Spectrum Disorders. In C. E. Richardson & R. A. Wood (Eds.), *Autism Spectrum Disorders* (pp. 41–72). Hauppauge, New York: Nova Science Publishers, Inc.

Harvey, P. D., Greenberg, B. R., & Serper, M. R. (1989). The affective lability scales:

development, reliability, and validity. *Journal of Clinical Psychology*, *45*(5), 786–793. http://doi.org/10.1002/1097-4679(198909)45:5<786::AID-JCLP2270450515>3.0.CO;2-P

Havermans, R., Nicolson, N. A., Berkhof, J., & DeVries, M. W. (2010). Mood reactivity to daily events in patients with remitted bipolar disorder. *Psychiatry Research*, *179*(1), 47–52. http://doi.org/10.1016/j.psychres.2009.10.020

Hay, A. C., Sheppes, G., Gross, J. J., & Gruber, J. (2015). Choosing How to Feel : Emotion Regulation Choice in Bipolar Disorder. *Emotion (Washington, D.C.)*, *15*(2), 139–145.

Henry, C., M'Bailara, K., Mathieu, F., Poinsot, R., & Falissard, B. (2008). Construction and validation of a dimensional scale exploring mood disorders: MAThyS (Multidimensional Assessment of Thymic States). *BMC Psychiatry*, *8*, 82. http://doi.org/10.1186/1471-244X-8-82

Henry, C., M'Baïlara, K., Poinsot, R., Casteret, A. A., Sorbara, F., Leboyer, M., & Vieta, E. (2007). Evidence for two types of bipolar depression using a dimensional approach. *Psychotherapy and Psychosomatics*, *76*, 325–331. http://doi.org/10.1159/000107559

Henry, C., Mitropoulou, V., New, A. S., Koenigsberg, H. W., Silverman, J., & Siever, L. J. (2001a). Affective instability and impulsivity in borderline personality and bipolar II disorders: similarities and differences. *Journal of Psychiatric Research*, *35*(6), 307–312. http://doi.org/10.1016/S0022-3956(01)00038-3

Henry, C., Mitropoulou, V., New, A. S., Koenigsberg, H. W., Silverman, J., & Siever, L. J. (2001b). Affective instability and impulsivity in borderline personality and bipolar II disorders: similarities and differences. *Journal of Psychiatric Research*, *35*(6), 307–312. http://doi.org/10.1016/S0022-3956(01)00038-3

Henry, C., Phillips, M., Leibenluft, E., M'Bailara, K., Houenou, J., & Leboyer, M. (2012). Emotional dysfunction as a marker of bipolar disorders. *Frontiers in Bioscience (Elite Edition)*, *4*, 2722–30. Retrieved from /pmc/articles/PMC3927326/?report=abstract

Henry, C., Van den Bulke, D., Bellivier, F., Roy, I., Swendsen, J., M'Baïlara, K., … Leboyer, M. (2008). Affective lability and affect intensity as core dimensions of bipolar disorders during euthymic period. *Psychiatry Research*, *159*(1–2), 1–6. http://doi.org/10.1016/j.psychres.2005.11.016

Hill, C. L. M., & Updegraff, J. a. (2012). Mindfulness and its relationship to emotional regulation. *Emotion (Washington, D.C.)*, *12*(1), 81–90. http://doi.org/10.1037/a0026355

Hofvander, B., Delorme, R., Chaste, P., Nyden, A., Wentz, E., Stahlberg, O., … Leboyer, M. (2009). Psychiatric and psychosocial problems in adults with normal-intelligence autism spectrum disorders. *BMC Psychiatry*, *9*, 35–43.

Houshmand, K., Braunig, P., Gauggel, S., Kliesow, K., Sarkar, R., & Kruger, S. (2010). Emotional vulnerability and cognitive control in patients with bipolar disorder and their healthy siblings: A pilot study. *Acta Neuropsychiatrica*, *22*(2), 54–62. http://doi.org/10.1111/j.1601-5215.2010.00451.x

Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism*, *4*(1), 63–83.

Hummer, T. A., Hulvershorn, L. A., Karne, H. S., Gunn, A. D., Wang, Y., & Anand, A. (2013). Emotional response inhibition in bipolar disorder: A functional magnetic resonance imaging study of trait- and state-related abnormalities. *Biological Psychiatry*, *73*(2), 136–143. http://doi.org/10.1016/j.biopsych.2012.06.036

Hurst, R. M., Nelson-Gray, R. O., Mitchell, J. T., & Kwapil, T. R. (2007). The relationship of Asperger's characteristics and schizotypal personality traits in a non-clinical adult sample. *Journal of Autism and Developmental Disorders*, *37*(9), 1711–20. http://doi.org/10.1007/s10803-006-0302-z

Ives-Deliperi, V. L., Howells, F., Stein, D. J., Meintjes, E. M., & Horn, N. (2013). The

effects of mindfulness-based cognitive therapy in patients with bipolar disorder: a controlled functional MRI investigation. *Journal of Affective Disorders*, *150*(3), 1152–7. http://doi.org/10.1016/j.jad.2013.05.074

Johnson, S. L., McKenzie, G., & McMurrich, S. (2008). Ruminative Responses to Negative and Positive Affect Among Students Diagnosed with Bipolar Disorder and Major Depressive Disorder. *Cognitive Therapy and Research*, *32*(5), 702–713. http://doi.org/10.1007/s10608-007-9158-6

Johnson, S. L., Tharp, J. A., Peckham, A. D., & Mcmaster, K. J. (2016). Emotion in Bipolar I Disorder : Implications for Functional and Symptom Outcomes. *Journal of Abnormal Psychology*, *125*(1), 40–52.

Kanske, P., Heissler, J., Schönfelder, S., Forneck, J., & Wessa, M. (2013). Neural correlates of emotional distractibility in bipolar disorder patients, unaffected relatives, and individuals with hypomanic personality. *The American Journal of Psychiatry*, *170*(12), 1487–96. http://doi.org/10.1176/appi.ajp.2013.12081044

Kendler, K. S., Gruenberg, A. M., & Strauss, J. S. (1981). An independent analysis of the Copenhagen sample of the Danish adoption study of schizophrenia. II. The relationship between schizotypal personality disorder and schizophrenia. *Archives of General Psychiatry*, *38*(9), 982–4. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7283669

King, B. H., & Lord, C. (2011). Is schizophrenia on the autism spectrum? *Brain Research*, *1380*(0), 34–41. http://doi.org/10.1016/j.brainres.2010.11.031

Kramer, U. (2012). Observer-rated Coping Associated with Borderline Personality Disorder: An Exploratory Study. *Clinical Psychology & Psychotherapy*, *251*(December 2012), 242–251. http://doi.org/10.1002/cpp.1832

Kuhn, R. (2004). Eugen Bleuler's concepts of psychopathology. *History of Psychiatry*, *15*(3), 361–366.

Kuyken, W., Weare, K., Ukoumunne, O. C., Vicary, R., Motton, N., Burnett, R., … Huppert, F. (2013). Effectiveness of the Mindfulness in Schools Programme: non-randomised controlled feasibility study. *The British Journal of Psychiatry*, *203*(2), 126–131. http://doi.org/10.1192/bjp.bp.113.126649

La Malfa, G., Lassi, S., Bertelli, M., Salvini, R., & Placidi, G. F. (2004). Autism and intellectual disability: A study of prevalence on a sample of the Italian population. *Journal of Intellectual Disability Research*, *48*(3), 262–267. http://doi.org/10.1111/j.1365-2788.2003.00567.x

Langdon, R., Coltheart, M., & Ward, P. B. (2006). Empathetic perspective-taking is impaired in schizophrenia: evidence from a study of emotion attribution and theory of mind. *Cognitive Neuropsychiatry*, *11*(2), 133–55. http://doi.org/10.1080/13546800444000218

Larson, F. V., Wagner, A. P., Jones, P. B., Tantam, D., Lai, M.-C., Baron-Cohen, S., & Holland, A. J. (2017). Psychosis in autism: a comparison of the features of both conditions in a dually-affected cohort. *British Journal of Psychiatry*, *210*(4), 269–275.

Lawton, M. P., Kleban, M. H., Rajagopal, D., & Dean, J. (1992). Dimensions of affective experience in three age groups. *Psychology and Aging*, *7*(2), 171–184. http://doi.org/10.1037/0882-7974.7.2.171

Lee, J., Altshuler, L., Glahn, D. C., Miklowitz, D. J., Ochsner, K., & Green, M. F. (2013). Social and nonsocial cognition in bipolar disorder and schizophrenia: Relative levels of impairment. *American Journal of Psychiatry*, *170*(3), 334–341. http://doi.org/10.1176/appi.ajp.2012.12040490

Lemaire, M., Aguillon-Hernandez, N., Bonnet-Brilhault, F., Martineau, J., & El-Hage, W. (2014). Subjective and physiological emotional response in euthymic bipolar patients: a pilot study. *Psychiatry Research*, *220*(1–2), 294–301.

http://doi.org/10.1016/j.psychres.2014.07.002
Linehan, M. M., Armstrong, H. E., Suarez, A., Allmon, D., & Heard, H. L. (1991). Cognitive-Behavioral Treatment of Chronically Parasuicidal Borderline Patients. *Archive of General Psychiatry*, *48*(April), 1060–1064. http://doi.org/10.1001/archpsyc.1991.01810360024003
Lockwood, P. L., Seara-Cardoso, A., & Viding, E. (2014). Emotion Regulation Moderates the Association between Empathy and Prosocial Behavior. *PLoS ONE*, *9*(5), e96555. http://doi.org/10.1371/journal.pone.0096555
Look, A. E., Flory, J. D., Harvey, P. D., & Siever, L. J. (2010). Psychometric properties of a short form of the Affective Lability Scale (ALS-18). *Personality and Individual Differences*, *49*(3), 187–191. http://doi.org/10.1016/j.paid.2010.03.030
Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview-Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, *24*(5), 659–685.
Mackinnon, D. F., & Pies, R. (2006). Affective instability as rapid cycling: theoretical and clinical implications for borderline personality and bipolar spectrum disorders. *Bipolar Disorders*, *8*(1), 1–14. http://doi.org/10.1111/j.1399-5618.2006.00283.x
Mahon, K., Perez-Rodriguez, M. M., Gunawardane, N., & Burdick, K. E. (2013). Dimensional endophenotypes in bipolar disorder: Affective dysregulation and psychosis proneness. *Journal of Affective Disorders*, *151*(2), 695–701. http://doi.org/10.1016/j.jad.2013.08.003
Matson, J. L., & Kozlowski, A. M. (2011). The increasing prevalence of autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*(1), 418–425. http://doi.org/10.1016/j.rasd.2010.06.004
Mayer, J. D. (2002). *Mayer-Salovey-Caruso emotional intelligence test*. Toronto: Multi-Health Systems.
Mazefsky, C. A., & White, S. W. (2014). Emotion regulation: concepts and practice in autism spectrum disorder. *Child and Adolescent Psychiatric Clinics of North America*, *23*(1), 15–24. http://doi.org/10.1016/j.chc.2013.07.002
McGuffin, P., Rijsdijk, F., Andrew, M., Sham, P., Katz, R., & Cardno, A. (2003). The Heritability of Bipolar Affective Disorder and the Genetic Relationship to Unipolar Depression. *Archives of General Psychiatry*, *60*(5), 497. http://doi.org/10.1001/archpsyc.60.5.497
McIntosh, W. D., & Martin, L. L. (1992). The cybernetics of happiness: the relation of goal attainment, rumination, and affect. In M. S. Clark (Ed.), *Emotion and social behavior. Review of personality and social psychology* (pp. 222–246). Thousand Oaks, CA: SAGE Publications.
Mealey, A., Abbott, G., Byrne, L. K., & McGillivray, J. (2014). Overlap between autistic and schizotypal personality traits is not accounted for by anxiety and depression. *Psychiatry Research*, *219*(2), 380–5. http://doi.org/10.1016/j.psychres.2014.05.040
Melville, C. A., Cooper, S.-A., Morrison, J., Smiley, E., Allan, L., Jackson, A., … Mantry, D. (2008). The prevalence and incidence of mental ill-health in adults with autism and intellectual disabilities. *Journal of Autism and Developmental Disorders*, *38*, 1676–1688.
Mendlowicz, M. V., Jean-Louis, G., Kelsoe, J. R., & Akiskal, H. S. (2005). A comparison of recovered bipolar patients, healthy relatives of bipolar probands, and normal controls using the short TEMPS-A. *Journal of Affective Disorders*, *85*(1–2), 147–151. http://doi.org/10.1016/j.jad.2004.01.012
Mercer, L., & Becerra, R. (2013). A unique emotional processing profile of euthymic bipolar

disorder? A critical review. *Journal of Affective Disorders*, *146*(3), 295–309. http://doi.org/10.1016/j.jad.2012.10.030
Michaels, T. M., Horan, W. P., Ginger, E. J., Martinovich, Z., Pinkham, A. E., & Smith, M. J. (2014). Cognitive empathy contributes to poor social functioning in schizophrenia: Evidence from a new self-report measure of cognitive and affective empathy. *Psychiatry Research*, *220*(3), 803–810. http://doi.org/10.1016/j.psychres.2014.08.054
Morioka, H., Kawaike, Y., Sameshima, H., & Ijichi, S. (2013). Behavioral and cognitive core domains shared between autism spectrum disorder and schizophrenia. *Open Journal of Psychiatry*, *3*(April), 26–31. http://doi.org/10.4236/ojpsych.2013.32A005
Myin-Germeys, I., van Os, J., Schwartz, J. E., Stone, A. A., & Delespaul, P. A. (2001). Emotional reactivity to daily life stress in psychosis. *Archives of General Psychiatry*, *58*(12), 1137–1144. http://doi.org/10.1001/archpsyc.58.12.1137
Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology*, *100*(4), 569–582. http://doi.org/10.1037/0021-843X.100.4.569
Nuechterlein, K. H., & Dawson, M. E. (1984). A Heuristic Vulnerability/Stress Model of Schizophrenic Episodes. *Schizophrenia Bulletin*, *10*(2), 300–312. http://doi.org/10.1093/schbul/10.2.300
O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality and Quantity*, *41*(5), 673–690. http://doi.org/10.1007/s11135-006-9018-6
Ousley, O., & Cermak, T. (2014). Autism Spectrum Disorder: Defining Dimensions and Subgroups. *Current Developmental Disorders Reports*, *1*(1), 20–28. http://doi.org/10.1007/s40474-013-0003-1
Ozonoff, S., Rogers, S. J., & Pennington, B. F. (1991). Asperger's Syndrome: Evidence of an Empirical Distinction from High-Functioning Autism. *Journal of Child Psychology and Psychiatry*, *32*(7), 1107–1122.
Pankowski, S., Adler, M., Andersson, G., Lindefors, N., & Svanborg, C. (2017). Group acceptance and commitment therapy (ACT) for bipolar disorder and co-existing anxiety – an open pilot study. *Cognitive Behaviour Therapy*, *46*(2), 114–128. http://doi.org/10.1080/16506073.2016.1231218
Paris, J., Gunderson, J., & Weinberg, I. (2007). The interface between borderline personality disorder and bipolar spectrum disorders. *Comprehensive Psychiatry*, *48*(2), 145–54. http://doi.org/10.1016/j.comppsych.2006.10.001
Park, J., Ayduk, O., O'Donnell, L., Chun, J., Gruber, J., Kamali, M., … Kross, E. (2014). Regulating the High: Cognitive and Neural Processes Underlying Positive Emotion Regulation in Bipolar I Disorder. *Clinical Psychological Science*, *2*(6), 661–674. http://doi.org/10.1177/2167702614527580
Pavlova, B., Uher, R., Dennington, L., Wright, K., & Donaldson, C. (2011). Reactivity of affect and self-esteem during remission in bipolar affective disorder: an experimental investigation. *Journal of Affective Disorders*, *134*(1–3), 102–11. http://doi.org/10.1016/j.jad.2011.04.023
Perugi, G., Angst, J., Azorin, J.-M., Bowden, C., Vieta, E., & Young, A. H. (2013). Is comorbid borderline personality disorder in patients with major depressive episode and bipolarity a developmental subtype? Findings from the international BRIDGE study. *Journal of Affective Disorders*, *144*(1–2), 72–78. http://doi.org/10.1016/j.jad.2012.06.008
Phillips, M. L. (2006). The neural basis of mood dysregulation in bipolar disorder. *Cognitive Neuropsychiatry*, *11*(December), 233–249. http://doi.org/10.1080/13546800444000290
Phillips, M. L., Ladouceur, C. D., & Drevets, W. C. (2008). A neural model of voluntary and automatic emotion regulation: implications for understanding the pathophysiology and

neurodevelopment of bipolar disorder. *Molecular Psychiatry*, *13*(9), 829, 833–57. http://doi.org/10.1038/mp.2008.65

Raine, A. (1991). The SPQ: a scale for the assessment of schizotypal personality based on DSM-III-R criteria. *Schizophrenia Bulletin*, *17*(4), 555–564. http://doi.org/10.1093/schbul/17.4.555

Reed, T., & Peterson, C. (1990). A comparative study of autistic subjects' performance at two levels of visual and cognitive perspective taking. *Journal of Autism and Developmental Disorders*, *20*(4), 555–567. http://doi.org/10.1007/BF02216060

Reich, D. B., Zanarini, M. C., & Fitzmaurice, G. (2012). Affective lability in bipolar disorder and borderline personality disorder. *Comprehensive Psychiatry*, *53*(3), 230–237. http://doi.org/10.1016/j.comppsych.2011.04.003

Reinares, M., Sánchez-Moreno, J., & Fountoulakis, K. N. (2014). Psychosocial interventions in bipolar disorder: What, for whom, and when. *Journal of Affective Disorders*, *156*, 46–55. http://doi.org/10.1016/j.jad.2013.12.017

Reniers, R. L. E. P., Corcoran, R., Drake, R., Shryane, N. M., & Völlm, B. a. (2011). The QCAE: a Questionnaire of Cognitive and Affective Empathy. *Journal of Personality Assessment*, *93*(1), 84–95. http://doi.org/10.1080/00223891.2010.528484

Rice, C., Chandler, E., Harrison, E., Liddiard, K., & Ferrari, M. (2015). Project Re•Vision: disability at the edges of representation. *Disability & Society*, *30*(4), 513–527. http://doi.org/10.1080/09687599.2015.1037950

Rihmer, Z., & Benazzi, F. (2010). Impact on suicidality of the borderline personality traits impulsivity and affective instability. *Annals of Clinical Psychiatry : Official Journal of the American Academy of Clinical Psychiatrists*, *22*(2), 121–8. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20445839

Rive, M. M., Mocking, R. J. T., Koeter, M. W. J., van Wingen, G., de Wit, S. J., van den Heuvel, O. a., … Schene, A. H. (2015). State-Dependent Differences in Emotion Regulation Between Unmedicated Bipolar Disorder and Major Depressive Disorder. *JAMA Psychiatry*, *72*(7), 1–10. http://doi.org/10.1001/jamapsychiatry.2015.0161

Rossi, a, & Daneluzzo, E. (2002). Schizotypal dimensions in normals and schizophrenic patients: a comparison with other clinical samples. *Schizophr Res*, *54*(1–2), 67–75. http://doi.org/10.1016/S0920-9964(01)00353-X

Rowland, J. E., Hamilton, M. K., Lino, B. J., Ly, P., Denny, K., Hwang, E.-J., … Green, M. J. (2013). Cognitive regulation of negative affect in schizophrenia and bipolar disorder. *Psychiatry Research*, *208*(1), 21–8. http://doi.org/10.1016/j.psychres.2013.02.021

Rowland, J. E., Hamilton, M. K., Vella, N., Lino, B. J., Mitchell, P. B., & Green, M. J. (2013). Adaptive associations between social cognition and emotion regulation are absent in schizophrenia and bipolar disorder. *Frontiers in Psychology*, *3*(January), 1–12. http://doi.org/10.3389/fpsyg.2012.00607

Ruggero, C. J., & Johnson, S. L. (2006). Reactivity to a laboratory stressor among individuals with bipolar I disorder in full or partial remission. *Journal of Abnormal Psychology*, *115*(3), 539–544.

Russell-Smith, S. N., Maybery, M. T., & Bayliss, D. M. (2011). Relationships between autistic-like and schizotypy traits: An analysis using the Autism Spectrum Quotient and Oxford-Liverpool Inventory of Feelings and Experiences. *Personality and Individual Differences*, *51*(2), 128–132. http://doi.org/10.1016/j.paid.2011.03.027

Ruzich, E., Allison, C., Smith, P., Watson, P., Auyeung, B., Ring, H., & Baron-Cohen, S. (2015). Measuring autistic traits in the general population: a systematic review of the Autism-Spectrum Quotient (AQ) in a nonclinical population sample of 6,900 typical adult males and females. *Molecular Autism*, *6*, 2. http://doi.org/10.1186/2040-2392-6-2

Salvatore, P., Baldessarini, R. J., Tohen, M., Khalsa, H. M., Sanchez-Toledo, J. P., Zarate

Jr., C. A., … Maggini, C. (2009). McLean-Harvard International First-Episode Project: two-year stability of DSM-IV diagnoses in 500 first-episode psychotic disorder patients. *J Clin Psychiatry*, *70*(4), 458–466. http://doi.org/ej08m04227 [pii]

Salvatore, P., Baldessarini, R. J., Tohen, M., Khalsa, H. M., Sanchez-Toledo, J. P., Zarate Jr., C. A., … Maggini, C. (2011). McLean-Harvard International First-Episode Project: two-year stability of ICD-10 diagnoses in 500 first-episode psychotic disorder patients. *J Clin Psychiatry*, *72*(2), 183–193. http://doi.org/10.4088/JCP.09m05311yel

Sasson, N. J., Pinkham, A. E., Weittenhiller, L. P., Faso, D. J., & Simpson, C. (2016). Context Effects on Facial Affect Recognition in Schizophrenia and Autism: Behavioral and Eye-Tracking Evidence. *Schizophrenia Bulletin*, *42*(3), 675–683. http://doi.org/10.1093/schbul/sbv176

Shouse, E. (2005). Feeling, emotion, affect. *M/C Journal*, *8*(6). Retrieved from http://journal.media-culture.org.au/0512/03-shouse.php

Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the Social Deficits of Autism: the Contribution of Non???Verbal Communication Measures. *Journal of Child Psychology and Psychiatry*, *27*(5), 657–669. http://doi.org/10.1111/j.1469-7610.1986.tb00190.x

Spaapen, D. L., Waters, F., Brummer, L., Stopa, L., & Bucks, R. S. (2014). The Emotion Regulation Questionnaire: validation of the ERQ-9 in two community samples. *Psychological Assessment*, *26*(1), 46–54. http://doi.org/10.1037/a0034474

Spek, A. A., & Wouters, S. G. M. M. (2010). Autism and schizophrenia in high functioning adults: behavioral differences and overlap. *Research in Autism Spectrum Disorders*, *4*(4), 709–717. http://doi.org/10.1016/j.rasd.2010.01.009

Stallard, P., Sayal, K., Phillips, R., Taylor, J. A., Spears, M., Anderson, R., … Montgomery, A. A. (2012). Classroom based cognitive behavioural therapy in reducing symptoms of depression in high risk adolescents: pragmatic cluster randomised controlled trial. *BMJ (Clinical Research Ed.)*, *345*(5), e6058. http://doi.org/10.1136/BMJ.E6058

Stegge, H., & Terwogt, M. M. (2007). Awareness and regulation of emotion in typical and atypical development. In J. J. Gross (Ed.), *Handbook of Emotion Regulation* (pp. 269–286). London: Guilford Press.

Stratta, P., Tempesta, D., Bonanni, R. L., de Cataldo, S., & Rossi, A. (2014). Emotional reactivity in bipolar depressed patients. *Journal of Clinical Psychology*, *70*(9), 860–5. http://doi.org/10.1002/jclp.22072

Tantam, D., & Girgis, S. (2009). Recognition and treatment of Asperger syndrome in the community. *British Medical Bulletin*, *89*, 41–62.

Thomas, J., Knowles, R., Tai, S., & Bentall, R. P. (2007). Response styles to depressed mood in bipolar affective disorder. *Journal of Affective Disorders*, *100*(1–3), 249–52. http://doi.org/10.1016/j.jad.2006.10.017

Townsend, J., & Altshuler, L. L. (2012). Emotion processing and regulation in bipolar disorder: a review. *Bipolar Disorders*, *14*(4), 326–39. http://doi.org/10.1111/j.1399-5618.2012.01021.x

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination Reconsidered: A Psychometric Analysis. *Cognitive Therapy and Research*, *27*(3), 247–259. http://doi.org/10.1023/A:1023910315561

Tsakanikos, E., Costello, H., Holt, G., Bouras, N., Sturmey, P., & Newton, T. (2006). Psychopathology in adults with autism and intellectual disability. *Journal of Autism and Developmental Disorders*, *36*, 1123–1129.

Van der Gucht, E., Morriss, R., Lancaster, G., Kinderman, P., & Bentall, R. P. (2009). Psychological processes in bipolar affective disorder: negative cognitive style and reward processing. *The British Journal of Psychiatry*, *194*(2), 146–51. http://doi.org/10.1192/bjp.bp.107.047894

Van Dijk, S., Jeffrey, J., & Katz, M. R. (2013). A randomized, controlled, pilot study of dialectical behavior therapy skills in a psychoeducational group for individuals with bipolar disorder. *Journal of Affective Disorders*, *145*(3), 386–393. http://doi.org/10.1016/j.jad.2012.05.054

Van Rheenen, T. E., Murray, G., & Rossell, S. L. (2015). Emotion regulation in bipolar disorder: Profile and utility in predicting trait mania and depression propensity. *Psychiatry Research*, *225*(3), 425–432. http://doi.org/10.1016/j.psychres.2014.12.001

Van Rheenen, T. E., & Rossell, S. L. (2014). Phenomenological predictors of psychosocial function in bipolar disorder: is there evidence that social cognitive and emotion regulation abnormalities contribute? *The Australian and New Zealand Journal of Psychiatry*, *48*(1), 26–35. http://doi.org/10.1177/0004867413508452

Van Winkel, R., Stefanis, N. C., & Myin-Germeys, I. (2008). Psychosocial stress and psychosis. A review of the neurobiological mechanisms and the evidence for gene-stress interaction. *Schizophrenia Bulletin*, *34*(6), 1095–1105. http://doi.org/10.1093/schbul/sbn101

Vannucchi, G., Masi, G., Toni, C., Dell'Osso, L., Erfurth, A., & Perugi, G. (2014). Bipolar disorder in adults with Asperger′s Syndrome: a systematic review. *Journal of Affective Disorders*, *168*, 151–60. http://doi.org/10.1016/j.jad.2014.06.042

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ*, *335*(7624).

White, R., Gumley, A., McTaggart, J., Rattrie, L., McConville, D., Cleare, S., & Mitchell, G. (2011). A feasibility study of Acceptance and Commitment Therapy for emotional dysfunction following psychosis. *Behaviour Research and Therapy*, *49*(12), 901–907. http://doi.org/10.1016/j.brat.2011.09.003

Williams White, S., Keonig, K., & Scahill, L. (2007). Social skills development in children with autism spectrum disorders: A review of the intervention research. *Journal of Autism and Developmental Disorders*, *37*(10), 1858–1868. http://doi.org/10.1007/s10803-006-0320-x

Wolkenstein, L., Zwick, J. C., Hautzinger, M., & Joormann, J. (2014). Cognitive emotion regulation in euthymic bipolar disorder. *Journal of Affective Disorders*, *160*, 92–7. http://doi.org/10.1016/j.jad.2013.12.022

Woodbury-Smith, M. R., Boyd, K., & Szatmari, P. (2010). Autism spectrum disorders, schizophrenia and diagnostic confusion. *Journal of Psychiatric Neuroscience*, *35*(5), 360.

World Health Organisation. (2007). International Statistical Classification of Diseases and Related Health Problems.

Zajonc, R. B. (1980). Feeling and thinking. *American Psychologist*, *35*(2), 151–175.

We do not understand very well why people experience mental health problems. It is likely to be because of a combination of biological factors (like genes and brain structure) and the effects of life experiences. Some people seem to be more sensitive to things like stress, and may be more likely to develop mental health problems when exposed to stress. However, there are lots of different ways of understanding people's difficulties, and the research reported here focussed on several different ones.

Literature Review

First, the study looked at the literature about what we know about people's abilities to manage their emotions, and how quickly their emotions change, in relation to one particular mental health problem: bi-polar disorder. Bi-polar disorder is a condition in which people experience extremes of emotion over relatively long periods of time, going from feeling deeply depressed at times to extremely energetic, excited, or irritable at other times. Looking at the studies that have been done to date, we wanted to know if emotional regulation difficulties (difficulty managing emotions) could help us understand bi-polar disorder as compared to other mental health problems. We found that it seems that if people have difficulty with emotional regulation, they are more vulnerable to mental health problems in general, not just bi-polar disorder. More research is needed to look into this, though, as most studies didn't compare people with bi-polar disorder to people with other mental health problems. The relatives of people with bi-polar disorder often seem to have more difficulties with emotions than the general population but less than people with a diagnosis, which suggests that emotion regulation might in part be a biological, inherited trait. However, studies have not adequately looked at the role of the family environment and life experiences.

This is a difficult thing to research because it requires people to remember what happened in the past, and memory is very unreliable/variable between people.

We also found that according to existing research, people with bi-polar disorder who are experiencing symptoms like abnormally low or high moods may be less good at managing their emotions or may experience stronger emotions than the general population. However, they can manage their emotions and there are psychological treatments that seem to work by helping people manage their emotions better. Compared to people with other mental health problems like depression, people with bipolar disorder don't seem to experience emotions more strongly.

Original Research

As well as looking at what research existed about bi-polar disorder and emotional regulation, we also did our own study in a related but different area. We know from other research that autistic people (AP; people who have been diagnosed with autism spectrum disorder, a complex social-perceptual condition that affect approximately 1 in 100 people) are more susceptible to mental health problems. One type of mental health problem that can be very distressing and difficult for people is called psychosis. This is when people experience or believe things that other people do not, and it can also come with problems with motivation or engagement, for example. Schizophrenia is a type of psychosis, but people with bi-polar disorder can also experience psychosis. AP experience psychosis much more frequently than the general population rate of 1-3%. In order to understand why this is, we looked at the relationship between autistic traits and traits of psychosis called schizotypy. Like autism, schizotypy is a continuum – everyone has some traits but when you have lots of traits, you are likely to develop psychosis or other difficulties. Schizotypy includes things like magical thinking, odd speech, and eccentric behaviour. Previous studies have found that there is a

relationship between how many autistic traits people have and how many schizotypal traits they have – generally, the more you have of one the more you have of the other. However, both ideas are made up of lots of different parts – autism isn't just one thing, but several different things that tend to occur together, and it is the same with schizotypy. There were hints from a bigger study that some AP who experience psychosis had difficulty with their emotions. Other studies suggested that both AP and people with psychosis had trouble understanding other people's perspectives. We wanted to see if these factors (difficulty with emotions and difficulty perspective taking) could help us understanding why schizotypy and autism are related.

In our study, we asked 43 neurotypical people (people without autism or a history of mental health problems) and 84 AP (25 of whom had experienced psychosis) to fill out surveys that measured their autistic traits, schizotypal traits, emotional regulation abilities, and their ability to understand other people's perspectives. We found that, similar to other studies, autistic traits and schizotypal traits were linked. However, what we found that was new was that levels of mood variability were also linked to schizotypal traits – higher levels of variability related to higher level of schizotypal traits. We know that mood variability may be a risk factor for mental health problems, and is something that can be treated with psychological therapy. This means that our results suggest that A) interventions for people with psychosis could consider a focus on managing emotions and B) it might be possible to help prevent psychosis from developing by helping people learn to manage their emotions before they become unwell. This could be done through teaching emotional skills in schools, for example. If some AP are particularly at risk of emotional problems, it may be that along with a diagnosis of autism, families and individuals can be helped to think about the importance of managing emotions early on. We didn't find any evidence that perspective taking is linked to schizotypy, but AP had difficulties with this, as previous studies had

shown. Not understanding how other people think or feel is likely to create stress for AP, and stress is known to be related to developing psychosis, so it might be that more resource needs to go into helping AP with social skills development.

Our study has some problems, like most research. The groups were fairly small, which means our confidence that these results are real and can apply to people more widely outside of the study isn't as high as it could be. Our neurotypical participants weren't as typical as they could have been, either – they had higher autistic and schizotypal traits than we would expect from the general population. It would also be good to include a group of people who had psychosis but not autism – we tried to do this but were not able to recruit enough people. Studies in the future should do this so we can see if the things we found in this study are also true of people who have psychosis but not autism, or if they are special to AP and psychosis.

Appendices

Appendix 1 – Studies Included in the Systematic Review

Description of studies included in the systematic review.

	Reference	Description
A	(Aas et al., 2014)	Study examining the relationship between childhood trauma scores and affective lability (as measured by the ALS) in patients with BP (n=42) and HC (n=14).
B	(Aas et al., 2015)	Validation study of ALS (ALS-54 and ALS-18) in individuals with BP (n=422), UR (n=201), and HC (n=307), which also compared ALS scores between groups.
C	(Akiskal et al., 1995)	This was a longitudinal study of 559 patients with UPD. They were followed up over 11 years and self-report personality measures were administered at baseline. Forty-eight converted to BP-II, 22 converted to BP-1, over this period. A bespoke "mood lability" factor created from the personality measures predicted 86% of conversion to BP illness from UPD.
D	(Akiskal et al., 2006)	Study comparing individuals with BP-I (n=98), BP-II (n=64), and UPD (n=251), as well as UR (n=617), on various temperamental dimensions, including "mood lability".

E	(Aminoff et al., 2012)	Study examining the relationship between self-reported affective lability and executive function (EF) in a group with BP (n=32) and a group of HC (n=60). Found higher affective lability in the BP group, and a link between EF and lability in the BP group only.
F	(Atzeni et al., 2013)	Validation study for the Multidimensional Assessment of Thymic States (MATHYS) tool. The MATHYS measures emotional reactivity. Patients with BP (n=187) were found to have significantly higher and lower scores than HC (n=89) during the acute phase of their illness.
G	(Becerra et al., 2013)	Three clinical groups were compared on their emotional regulation ability using self-report (DERS). BP (n=48), UPD (n=50), anxious (n=50) and HC (n=48) groups were studied. All clinical groups had greater difficulties than HC. BP had a distinct profile of difficulty, compared with UPD and anxiety, which resembled each other.
H	(Benazzi, 2004b)	Study comparing individuals with BP-II (n=89) and UPD (n=89) on two simple questions. Found that people who identify as having “frequent ups and downs” were reliably and sensitively predictive of BP-II to a moderate degree.

I	(Benazzi, 2004a)	Very similar study to Benazzi (2004) above – same sample, same questions, published in a different journal.
J	(Benazzi & Akiskal, 2005)	Similar to Benazzi (2004a, 2004b), study examining responses of individuals with BP-II (n=62) and UPD (n=59), all outpatients who did not have co-morbid BPD, found that self-identification of having frequent ups and downs/mood swings was a reasonably sensitive and specific way of identifying those with BP-II.
K	(Bowen et al., 2008)	Study of women with alcohol dependence (n=22) and HC (n=23). Some of the women with alcohol dependence also had BP (n=14). Compared patients and controls on mood scales and affect variability, found patients scored higher than controls on these measures.
L	(Caseras et al., 2015)	Neuroimaging study of emotion regulation comparing HC (n=20), euthymic BP-I (n=16), and euthymic BP-II (n=19). Found functional and anatomical differences between BP-I group and other groups.

M	(Corbalán et al., 2015)	Neuroimaging study comparing individuals with BP-I (n=19) and HC (n=17) during the performance of an emotion regulation task. BP individuals could down-regulate emotion, but their emotional systems seemed to be more readily activated than HC.
N	(Cuellar et al., 2009)	Study comparing individuals with BP-I (n=35) and HC (n=35) in an experimental task that involved exposing them to criticism. BP group reacted more negatively to criticism but recovered just as quickly as HC.
O	(Deckersbach et al., 2008)	Neuroimaging study of a two-back working memory task with sad mood induction. BP-I currently depressed (n=9) and HC (n=17), all female, completed the task. No differences were found in their performance on the task, but structural differences were found.
P	(Edge et al., 2014)	Experimental study comparing individuals with euthymic BP-I (n=47) with HC (n=43) on a task that involved induced frustration while playing a computer game. Found both groups were equally reactive to frustration.

Q	(Eich et al., 2014)	Combined study of individuals with BPD (n=27), BP-I (n=17), BP-II (n=7), and ADHD (n=23), examining whether temperament could distinguish diagnostic categories. They found there was 54% diagnostic overlap between disorders in terms of rates of cyclothymia.
R	(Favre et al., 2015)	Neuroimaging study of performance on a word-face Emotional Stroop Task, comparing individuals with BP (n=14) and HC (n=13). The BP group were slower to process incongruent stimuli, and also showed significant differences in brain connectivity.
S	(Fletcher et al., 2013)	Large study of individuals with BP-I (n=94), BP-II (n=114), UPD (n=109), and HC (n=100) comparing them on coping styles. BP groups were more likely to ruminate about positive affect and engage in risk-taking in response to negative affect, but the latter was influenced by medication and current mood. Rumination appeared to be a trait-like response in BP-II group.
T	(Fletcher et al., 2014)	Study comparing those with BP-II (n=24) and BPD (n=24), matched for age and gender. Their emotion regulation abilities and parental styles were studied. BPD group used more maladaptive emotion regulation strategies, were less likely to use adaptive emotion regulation strategies, and

		scored higher on most dysfunctional parenting sub-scales, indicating more difficult childhood experiences of parenting than the BP group.
U	(K. E. Gilbert et al., 2013)	Study comparing individuals with BP-I in remission (n=31) and those with UPD (n=31) on coping styles during an emotion induction. Both groups showed increased positive emotion in response to positive emotion rumination. Attempts to dampen positive emotion resulted in increased emotional reactivity and prospective increases in manic and depressive symptoms in the BP group only.
V	(K. Gilbert & Gruber, 2014)	Data from the same study as above. BP-I (n=31), UPD (n=31), and HC (n=31) groups were compared during rumination or mindfulness tasks. Across all groups, ruminating increased both positive and negative emotion and elevated physiological arousal. Mindfulness increased positive emotion and parasympathetic responding.
W	(Green et al., 2011)	Participants with BP-I (n=105) were compared with UR (n=124) and HC (n=63) using the CERQ. The BP group were found to use rumination, catastrophizing, and self-blame more frequently, with less use of putting into perspective, in response to negative life events. Rumination frequency was related to current symptom level.

X	(Gruber et al., 2008)	Euthymic BP-I participants (n=21), individuals with insomnia (n=19), and HC (n=20) were compared on coping strategies. Rumination and worry were more common in the clinical groups than in HC. The BP group had more negative thoughts than HC, but no significant difference between insomnia and BP on negative thoughts.
Y	(Gruber, Eidelman, et al., 2011)	Study comparing individuals with BP-I (n=39) and HC (n=34) on rumination in response to positive and negative emotion. The study also measured responses to rumination practised in an experimental setting. The BP group ruminated more on both positive and negative emotions, but there were no significant group differences found during the rumination task. Rumination frequency predicted lifetime depression and mania frequencies in the BP group.
Z	(Gruber et al., 2012)	This study shared data with another published study. Individuals with BP (BP-I n=34, BP-II n=3) and HC (n=38) were examined for spontaneous use of reappraisal and suppression, and general success at regulating emotion while watching emotionally evocative films. Those in the BP group used more reappraisal and suppression during the films than HC, and reported more effort but less success in regulating their emotional responses to the films.

AA	(Gruber, Harvey, et al., 2011)	A group of euthymic individuals with BP-I (n=23) were compared with HC (n=24) for emotional reactivity and recovery during and after watching emotionally evocative film clips. The BP group reported subjectively more positive emotion during the task, and this was confirmed physiologically. There were no group differences in emotion recovery following the end of the films.
AB	(Gruber et al., 2014)	This study used data from the same experiment as Gruber, Harvey, and Purcell (2011). They found that reappraisal reduced emotional reactivity for both positive and negative emotions in both groups on both subjective, behavioural (facial expressions) and physiological measures.
AC	(Gruber et al., 2013)	This study compared individuals with BP-I (n=31), HC (n=32), and UPD (n=21), all "remitted" at the time of the study. Participants recorded data over a six-day period on their emotional state four times a day (at quasi-random times). The BP group reported a similar level of positive emotionality to the HC group, and a similar level of negative emotionality as the UPD group. Both clinical groups reported greater use of ER strategies than HC.

AD	(Gul & Khan, 2014)	Forty euthymic BP-I individuals and forty HC performed face categorisation tasks that alternately used emotion features. They also completed an ER questionnaire. The BP group showed a larger switch cost for non-emotional stimuli, and more frequent use of emotion suppression. They also used less cognitive reappraisal. Self-reported ER significantly predicted task-switching abilities.
AE	(Havermans, Nicolson, Berkhof, & DeVries, 2010)	Patients with BP (n=31 BP-I, n=7 BP-II) from a lithium clinic took part, as well as 38 HC. Experience sampling methodology was used over a six day period, with 10 daily prompts to record emotional state and context. The BP group had higher mean levels of negative affective and lower mean levels of positive affect, but there was a similar level of reactivity to events in the BP and HC groups. Individuals with elevated, but still sub-syndromal depressive symptoms showed larger negative responses to daily hassles.
AF	(Hay et al., 2015)	BP-I (n=25) and HC (n=26) participants viewed images with either high or low positive or negative content. They were told to choose either reappraisal or distraction to regulate their emotional responses. In the high-intensity images, both groups chose distraction over reappraisal, but there were no between-group differences in response.

AG	(Henry et al., 2001b)	This study examined the relationship between BP and BPD. Individuals with BPD (n=29), BP (n=14), and both (n=12), as well as a group with other personality disorders (n=93) were administered the ALS. There was a different profile for individuals with BPD, tending to switch between euthymia and anger, compared with BP (euthymia and depression/elation, and between depression and elation). Those with BPD had the highest overall ALS scores, followed by BP, then the PD group.
AH	(Henry, Van den Bulke, et al., 2008)	This was a large study of 179 euthymic BP patients (n=141 BP-I, majority had experienced psychosis) and HC (n=86). Participants completed the ALS and AIM. BP participants reported more intense emotions and more affective lability than HC. Higher scores on both domains were associated with higher axis-I comorbidity, and higher lability score was associated with earlier age of onset.
AI	(Houshmand et al., 2010)	Euthymic BP-I (n=34), their healthy siblings (n=22), and HC (n=33) were compared on performance of a stop-signal paradigm linked to mood induction of either sadness or relaxation. The BP group showed higher emotional reactivity compared to other groups. Compared with HC,

		BP had longer reaction times during relaxed mood state, and impaired response inhibition during periods of induced sadness.
AJ	(Ives-Deliperi et al., 2013)	This trial compared results of a Mindfulness Based Cognitive Therapy intervention compared with waitlist control. Individuals with BP (n=23) took part, along with HC (n=10). The study found that after the eight-week intervention, improvements were seen in ER and on other measures.
AK	(Johnson, McKenzie, & McMurrich, 2008)	This study compared people with BP (n=28), UPD (n=35), and HC (n=44), drawn from an undergraduate university population. Participants completed rumination measure and RPA. Those with BP and UPD indicated higher use of rumination in response to negative affective. Those with BP endorsed higher rumination in response to positive affect as well. In the BP group, ruminating on negative affect correlated with current depressive symptoms.
AL	(Johnson et al., 2016)	Individuals with BP-I (n=67) were matched with a group of HC (n=58). BP participants were interviewed monthly until they were found to be in remission, then tested on emotion measures. Thirty-six BP also completed a 12-month follow-up interview. BP was found to be linked to a range of emotional disturbances, particularly elevations of negative emotion. High negative

		emotion, low positive emotion, and high use of suppression predicted lower levels of functioning. Reappraisal predicted less depression over time in the BP group.
AM	(Kramer, 2012)	Outpatients with BPD (n=25) were compared to inpatients with BP (n=25) and HC (n=25). Clinical interviews focussing on coping patterns were rated using a observer-rater system. The study ANfound that those with BPD lack affect regulation skills particularly related to autonomy compared with the other groups.
AN	(Lee et al., 2013)	This study compared individuals with BP (n=46 BP-I, n=22 BP-II) who were mostly euthymic, to clinically stable outpatients with schizophrenia (n=38) and HC (n=36). All participants completed social and non-social cognitive tasks. It found that the BP group did not differ from HC on social cognitive tasks, and both were better on these than the schizophrenia group.
AO	(Lemaire et al., 2014)	Experimental study where euthymic BP (n=16 BP-I, n=10 BP-II) and HC (n=30) groups viewed emotion-eliciting photographs. Their subjective emotional response and physiological response was measured and compared. No difference was found in subjective emotional response. Pupil dilation was smaller in BP individuals than in HC.

AP	(Mahon et al., 2013)	This study examined temperament of siblings of individuals with BP (n=55), individuals with BP (n=47 BP-I, n=5 BP-II, n=3 BP-NOS), and HC (n=113) using the TEMPS-A and SPQ. The BP group had higher SPQ and higher on all but one scale of the TEMPS-A scores. Siblings were intermediate between BP and HC for the anxious subscale of the TEMPS-A, and on interpersonal deficits and disorganised subscales of the SPQ.
AQ	(Mendlowicz et al., 2005)	UR (n=52), BP (n=18 BP-I, n=5 BP-II), and HC (n=102) completed the TEMPS-A. BP had the highest cyclothymia scores, UR were a midway point, and HC had least. UR and BP were higher on anxiety scale, and hyperthymic scores were highest in HC.
AR	(Park et al., 2014)	This study explored self-distancing in individuals with BP (n=22 BP with a history of psychosis, n=16 BP with no history of psychosis) and HC (n=17). Participants were asked to reflect on a positive autobiographical memory and rate the level of spontaneous self-distancing. BP with psychosis self-distanced less and showed more neurophysiological (EEG) signs of positive emotional reactivity compared to the other two groups.

AS	(Pavlova et al., 2011)	A group of primarily BP-I patients in remission (n=24) were compared with HC (n=24) on an anagram-solving task that generated experiences of success and failure that were manipulated experimentally. Affect and self-esteem were measured before each task, and early adversity was ascertained by questionnaire. The BP group showed more reactivity of affect and explicit self-esteem than HC, but there was no difference in implicit self-esteem. Childhood trauma predicted increased reactivity to failure but not to success.
AT	(Reich et al., 2012)	This study compared individuals with BPD (n=29) and BP-II or cyclothymia (n=25) on ALS, AIM, and other lability measures. They found a pattern of higher euthymia-elation scores in the BP group, as well as higher AIM scores. The BPD group showed less intense and less frequent shifts between euthymia and elation/depression, as well as switches between elation and depression.
AU	(Rihmer & Benazzi, 2010)	This large study of individuals with BP-II (n=138) and UPD (n=71) examined affective instability in these groups, in the context of whether it was a good predictor of suicidality. They found a positive correlation between suicidality and impulsiveness and affective instability. However,

		impulsivity was an independent predictor whereas affective instability acted via impulsivity to increase suicidality in both groups.
AV	(Rive et al., 2015)	This neuroimaging (fMRI) study compared individuals with BP (n=35, remitted), UPD (n=42; half remitted, half symptomatic), and HC (n=36). The study used positive and negatively arousing images, and found that those with BP showed impaired emotional regulation abilities regardless of image valance. Depressed UPD regulated sad and happy emotions less well than BP and HC. Compared with remitted UPD, BP performed worse on negative emotion regulation but not significantly different on positive emotion regulation.
AW	(Rowland, Hamilton, Lino, et al., 2013)	This is one of the few studies comparing individuals with schizophrenia (n=126) with those with BP-I (n=97) and HC (n=81). All participants completed the CERQ as well as current mood measures. The clinical groups reported more rumination, catastrophizing, and self-blame than HC, and less use of putting into perspective. Those with schizophrenia were more likely to engage in other-blame compared to HC. Rumination and reduced positive appraisal predicted current symptoms in the BP group.

AX	(Rowland, Hamilton, Vella, et al., 2013)	Participants in this study completed the Ekman 60-faces emotion recognition task along with the CERQ and a measure of social inference. The groups were one with SCZ (n=56), BP-I (n=33), and HC (n=58). Results showed that both clinical groups had greater theory of mind deficits compared to controls, although SCZ were more impaired than BP. Those with BP were more likely to blame themselves and less likely to engage in positive reappraisals, relative to controls. There was no association between social cognitive abilities and affect regulation in the clinical groups.
AY	(Ruggero & Johnson, 2006)	This study compared individuals with BP-I in full or partial remission (n=28) with HC (n=40) in an experimental task in which failure was manipulated. No significant differences were found in reported affect following the tasks, but the BP group performed slightly worse on subsequent tasks after the failure condition.
AZ	(Stratta, Tempesta, Bonanni, de Cataldo, & Rossi, 2014)	When viewing emotionally affecting photographs, individuals with BP (n=23; all in depressive episode) were found to be more emotionally affected than HC (n=27). This was based on self-reported mood ratings. There was no difference between pleasant or unpleasant images.

BA	(Thomas et al., 2007)	This study was unusual in that it compared individuals in different mood states within a BP group, and also HC (n=44). Those experiencing depression (n=14), mania (n=30), or in permission (n=29) were compared on their responses to the Response Styles Questionnaire. The manic group used active coping and risk taking significantly more than the other BP groups or HC. The remitted group reported significantly more use of rumination than HC.
BB	(Van der Gucht et al., 2009)	In a large study of individuals with BP in a variety of mood states (n=34 manic/hypomanic or mixed state, n=20 depressed, n=43 euthymic), this study examined differences on a range of self-rated and experimental measures. There was a group of HC (n=41). The study found that all BP groups differed from HC in their response to rewards, and also on all measures of depression. There were correlations between negative cognitive styles and depressed symptoms, as well as between reward responsivity and manic symptoms.
BC	(Van Rheenen et al., 2015)	Fifty individuals with BP (n=38 BP-I and n=12 BP-II) were compared with 52 HC using the DERS and General Behavior Inventory. The clinical group had difficulites in emotional regulation across most domains. Impulse control difficulties predicted mania/hypomania propensity in the BP group.

		Poor access to mood regulation strategies predicted depression in the BP group. The HC group had different predictors.
BD	(Wolkenstein et al., 2014)	Individuals with BP (n=42, 62% BP-I), UPD (n=43), and HC (n=39) took part in this study. They completed the CERQ. The clinical groups reported increased rumination, catastrophizing, and self-blame compared with HC. They reported decreased use of positive reappraisal and putting into perspective as well. There were no significant differences found between the BP and UPD groups.

Appendix 2 – STROBE Statement Checklist

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why

Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		

Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Appendix 3 – STROBE scores

STROBE scores for the studies described in Appendix 1 and included in the systematic review. The final column shows the total score achieved by a given study as rated against the STROBE checklist. * denotes studies that are experimental rather than purely observational in design

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**T**
A	1	1	1	0	1	1	1	1	1	0	1	2	0	1	0	0	0	1	1	1	1	1	17
B	1	1	1	1	0	0	1	1	1	0	1	2	0	1	1	1	1	1	1	1	1	1	19
C	1	1	1	1	0	1	1	1	0	0	1	3	2	1	1	0	1	1	1	1	0	0	19
D	1	1	1	1	0	0	1	1	0	0	1	2	0	1	0	0	1	0	1	1	1	0	14
E	1	1	1	1	1	1	1	1	0	0	1	3	0	2	1	1	1	1	1	1	0	1	21
F	1	1	1	1	0	0	0	0	0	0	1	4	0	2	1	1	1	1	0	0	0	0	15
G	1	1	1	1	1	1	1	1	0	0	1	3	0	2	1	1	1	1	1	1	1	0	21

H	1	1	1	1	0	1	1	1	0	0	1	2	0	0	1	0	0	0	1	1	0	0	13
I	1	1	1	1	0	0	1	1	0	0	1	2	0	1	0	1	1	0	1	1	0	0	14
J	1	1	1	1	0	0	0	1	1	0	1	2	0	1	1	1	1	0	0	0	0	0	13
K	1	1	1	1	0	1	1	1	0	0	1	3	1	1	1	0	1	1	1	1	1	0	19
L	1	1	1	1	0	1	1	1	0	0	1	2	2	1	1	1	1	1	1	1	0	1	20
M	1	1	0	1	0	1	1	1	0	0	1	2	0	2	1	1	1	0	1	1	1	1	18
N*	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	0	1	0	1	1	1	0	16
O	1	1	1	1	0	2	1	1	1	0	1	3	0	0	1	0	1	1	1	1	1	0	19
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**T**
P*	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	1	1	1	1	0	19
Q	1	1	0	1	0	1	1	1	0	0	1	2	2	1	1	1	1	0	1	1	1	1	19

R*	2	1	1	1	0	0	1	1	0	0	1	2	0	1	1	1	1	1	1	1	1	1	19
S	1	1	1	0	0	1	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	1	17
T	1	1	1	1	0	1	1	1	0	0	1	2	0	2	1	0	1	0	1	1	1	1	18
U	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	0	17
V*	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	1	18
W	1	1	1	1	0	1	1	1	0	0	1	3	0	0	1	1	1	1	1	1	0	1	18
X	1	1	1	1	0	0	1	1	0	0	1	2	0	1	1	0	1	1	1	1	1	0	16
Y*	1	1	1	1	0	0	1	1	0	0	1	2	0	0	1	1	1	1	1	1	0	0	15
Z*	1	1	1	0	0	0	1	1	1	0	1	2	0	0	1	0	1	1	1	1	1	0	15
AA*	1	1	0	1	0	0	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	1	16
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**T**

AB*	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	1	1	1	1	0	19
AC	2	1	1	1	0	1	1	1	0	0	1	3	1	1	1	2	1	1	1	1	1	0	22
AD*	1	1	1	1	0	1	1	0	0	0	1	2	0	1	1	1	1	1	1	1	1	0	17
AE	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	0	1	1	1	0	17
AF*	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	1	1	1	1	1	20
AG	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	0	1	1	0	1	17
AH	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	0	0	1	0	1	17
AI*	1	1	1	1	0	1	1	1	0	0	1	2	0	0	1	2	1	0	0	1	0	0	15
AJ*	2	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	0	0	1	0	1	17
AK	1	1	1	1	0	1	1	1	0	0	1	2	0	0	1	1	1	0	1	1	1	0	16
AL	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	0	1	1	0	0	17

AM	1	1	1	1	0	2	1	1	0	0	1	2	0	0	1	1	1	1	1	1	1	19
AN	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	0	1	1	0	17
AO*	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	1	0	1	0	16
AP	1	1	1	1	0	1	1	1	0	0	1	2	0	2	1	1	1	0	1	1	1	19
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**T**
AQ	1	1	1	1	0	1	1	1	0	0	1	3	0	0	1	1	1	0	0	1	0	1	16
AR*	1	1	1	1	0	1	1	1	0	0	1	2	0	2	1	1	1	0	1	1	0	1	18
AS*	2	1	1	1	0	2	1	1	0	0	1	2	0	1	1	1	1	1	1	1	1	1	21
AT	1	1	0	1	0	1	1	1	1	0	1	2	0	1	1	1	1	0	1	1	0	0	16
AU	1	1	1	0	0	1	1	1	0	0	1	2	0	1	1	1	1	0	1	1	0	0	15
AV*	1	1	1	1	1	1	1	1	0	0	1	3	0	1	1	1	1	0	1	1	1	1	20

AW	1	1	1	1	0	1	1	1	0	0	1	3	0	1	1	1	1	1	1	1	0	1	19
AX*	1	1	1	1	0	1	1	1	0	0	0	3	0	1	1	1	1	1	1	1	1	1	19
AY*	1	1	1	1	0	1	1	1	0	0	1	4	0	1	1	1	1	1	1	1	0	0	19
AZ*	1	1	1	1	0	1	1	1	0	0	1	2	0	0	1	1	1	0	1	1	0	0	15
BA	1	1	1	1	0	2	1	1	0	0	0	2	0	1	1	1	1	0	1	1	0	0	16
BB*	1	1	1	1	0	2	1	1	0	0	1	3	0	1	1	1	1	1	1	1	0	1	20
BC	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	0	17
BD	1	1	1	1	0	1	1	1	0	0	1	2	0	1	1	1	1	1	1	1	0	1	18
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**T**

Appendix 4 – Ethical Approval Letter

Copy of ethical approval letter for the empirical research study.

North of Scotland Research Ethics Service
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS Grampian

21 December 2015

Dr Felicity V Larson
University of Birmingham School of Psychology
Frankland Building
Edgbaston
BIRMINGHAM
B15 2TT

Dear Dr Larson

Study title:	**Birmingham Autism, Schizotypy, and Emotions Study (BASES)**
REC reference:	**15/NS/0125**
IRAS project ID:	**186541**

Thank you for your letter of 21 December 2015, responding to the Proportionate Review Sub-Committee's request for changes to the documentation for the above study.

The revised documentation has been reviewed and approved by the Lead Reviewer.

With regards to point 1, we would ask that you use the statement 'The information you provide can be withdrawn at any time up until we analyse the study data, which is likely to be in the Spring of 2017'.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact the REC Manager Mrs Carol Irvine, nosres@nhs.net. Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for HRA Approval (England)/ NHS permission for research is available in the Integrated Research Application System, www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" above).

Approved documents

The documents reviewed and approved by the Committee are:

Document	*Version*	*Date*
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only)		18 November 2015
IRAS Checklist XML: Checklist 21122015		21 December 2015
Letter from Sponsor		18 November 2015
Letters of invitation to participant: ASD-NP Recruitment Email	1.0	9 September 2015
Letters of invitation to participant	1.1	21 December 2015
Letters of invitation to participant: Study Reminder Email	1.0	21 December 2015
Response to Provisional Opinion		21 December 2015
Participant Consent Form	1.0	9 September 2015
Participant Information Sheet (PIS): ASD-P	1.1	21 December 2015
Participant Information Sheet (PIS): ASD-NP	1.1	21 December 2015
Participant Information Sheet (PIS): FEP	1.1	21 December 2015
REC Application Form: REC Form 27112015		27 November 2015
Referee's report or other scientific critique report: Peter Watson review		29 April 2015
Research protocol or project proposal	1.0	9 September 2015
Summary CV for Chief Investigator (CI): Felicity Larson		9 September 2015
Summary CV for supervisor (student research): Stephen Wood		9 September 2015
Validated questionnaire: The Adult Autism Spectrum Quotient (AQ) Ages 16+		27 November 2015*
Validated questionnaire: SPQ-BR		27 November 2015*
Validated questionnaire: Affective Lability Scale - 18		27 November 2015*
Validated questionnaire: Emotion Regulation Questionnaire - 9		27 November 2015*
Validated questionnaire: Questionnaire of Cognitive and Affective Empathy - Perspective-taking Sub Scale		27 November 2015*

* date received

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:
http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

15/NS/0125	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely

Professor Helen Galley
Chair

Enclosures: "After ethical review – guidance for researchers" SL-AR2

Copy to: Dr Sean Jennings

Appendix 5 – Information Sheets

PARTICIPANT INFORMATION SHEET (ASD-P, v1.0)

UNIVERSITY OF BIRMINGHAM

Title of Project: The Birmingham Autism, Schizotypy, and Emotions Study (BASES)

Researchers: Dr Felicity Larson, Professor Stephen Wood, Dr Renate Renier, Dr Katie Chisholm

We would like to invite you to take part in our research study. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please read this information carefully and contact us if you have any questions. Our contact information in included on the second page. Reading this information sheet will take up to 10 minutes.

- **What is the purpose of this research?**

BASES is a project being run by Dr Felicity Larson as part of her clinical psychology doctorate degree at the University of Birmingham. This study is aimed at helping us understand why some people with autism spectrum disorder suffer (ASD) from a type of mental illness called psychosis, and what might be keeping other people with ASD well. We also want to understand if there are any differences between people who experience psychosis, depending if they have ASD or not. To answer these questions, we want to measure ASD traits, certain personality traits (known as schizotypy), and how people experience and cope with strong emotions.

- **Why have I been invited to take part?**

You have been invited because you took part in a previous study conducted by Dr Larson at the University of Cambridge between 2009 and 2012, and said you would be happy to be contacted about future research. For the current study, we are interested in getting the responses of people who have ASD and have also experienced psychosis, as this is a relatively rare group of people. We want to understand if there are any differences between people with ASD who have had psychosis and people with ASD who have not.

- **What will happen to me if I agree to take part?**

You will be asked to complete five questionnaires on-line, or if you do not have access to the internet, via pen and paper. This should take you between 30-45 minutes. Some of the questions may be similar to or the same as questionnaires you have completed before – this is ok.

- **What will happen to the information I give?**

Your answers to the questionnaires will be stored electronically in a database, along with the answers of other people who took part in the study. Your information will be identified by an anonymised code, in a file protected with a password, and will be kept separately from your name and any other personal identifiable data about you. Paper files will be stored in a locked

filing cabinet in a secure building. Only members of the research team will have access to your information.

- **What will happen if I do not want to carry on with the study?**

You do not have to take part in the research. If you start answering the questionnaires but change your mind, you do not have to continue. You do not have to give a reason why you do not wish to participate, but it would be helpful if you could let the study team know so that they do not contact you again. Once you have given us your answers to the questionnaires, however, it will not be possible to change your mind.

- **Expenses and payments**

We cannot pay you for taking part in the study, but as a thank you for your time, you will have the chance to enter yourself into a prize draw for one of 3 £15 Amazon gift vouchers. The prize draw will take place once the study is complete, which will be no later than April 2017.

- **What will happen to the results of the research study?**

The findings will be written up as part of Dr Larson's clinical psychology doctorate degree. In addition, we will publish any interesting findings in scientific journals. We will also send you copies of the results, if you would like, and will host an event at the University of Birmingham for those who would like to attend a talk about the results. This would be in the spring/summer of 2017.

- **Who has reviewed the study?**

The North of Scotland Research Ethics Committee (1) has reviewed the study and they consider it safe and ethical.

- **What happens if I have any further concerns?**

If you have any concerns about taking part, we encourage you to talk to other people you are close to about it, or contact the research team. Remember, you do not have to take part – your care and treatment will stay the same no matter what you decide.

If you would like to discuss any aspect of this research please contact:

Tel: 0121 414 7124

Email: fxl437@bham.ac.uk

Post: Dr Felicity Larson, School of Clinical Psychology, Department of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

PARTICIPANT INFORMATION SHEET (ASD-P2, v1.0)

UNIVERSITY OF BIRMINGHAM

Title of Project: The Birmingham Autism, Schizotypy, and Emotions Study (BASES)

Researchers: Dr Felicity Larson, Professor Stephen Wood, Dr Renate Renier, Dr Katie Chisholm

We would like to invite you to take part in our research study. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please read this information carefully and contact us if you have any questions. Our contact information in included on the second page. Reading this information sheet will take up to 10 minutes.

- **What is the purpose of this research?**

BASES is a project being run by Dr Felicity Larson as part of her clinical psychology doctorate degree at the University of Birmingham. This study is aimed at helping us understand why some people with autism spectrum disorder suffer (ASD) from a type of mental illness called psychosis, and what might be keeping other people with ASD well. We also want to understand if there are any differences between people who experience psychosis, depending if they have ASD or not. To answer these questions, we want to measure ASD traits, certain personality traits (known as schizotypy), and how people experience and cope with strong emotions.

- **Why have I been invited to take part?**

You have been invited because you have had a diagnosis of ASD and have experienced psychosis. In this study, we are interested in the responses of people who have ASD and have also experienced psychosis, as this is a relatively rare group of people. We want to understand if there are any differences between people with ASD who have had psychosis and people with ASD who have not.

- **What will happen to me if I agree to take part?**

You will be asked to complete a telephone interview with Dr Larson about your diagnosis of ASD and your experience of psychosis. This interview can take up to an hour, and asks about things you may find distressing to talk about, so it is important that you are sure you want to share this information before you agree to take part. If you decide there are questions that you don't want to answer or that you would rather not take part, that is ok.

After the telephone interview, we will check that you meet our criteria. If you do, you will be sent a link to five questionnaires on-line, or if you do not have access to the internet, via post. These questionnaires should take you between 30-45 minutes. Some of the questions may be similar to or the same as questionnaires you have completed before – this is ok.

- **What will happen to the information I give?**

Your answers to the questionnaires will be stored electronically in a database, along with the answers of other people who took part in the study. Your information will be identified by an anonymised code, in a file protected with a password, and will be kept separately from your

name and any other personal identifiable data about you. Paper files will be stored in a locked filing cabinet in a secure building. Only members of the research team will have access to your information.

- **What will happen if I do not want to carry on with the study?**

You do not have to take part in the research. If you start answering the interview questions or questionnaires but change your mind, you do not have to continue. You do not have to give a reason why you do not wish to participate, but it would be helpful if you could let the study team know so that they do not contact you again.

- **Expenses and payments**

We cannot pay you for taking part in the study, but as a thank you for your time, you will have the chance to enter yourself into a prize draw for one of 3 £15 Amazon gift vouchers. The prize draw will take place once the study is complete, which will be no later than April 2017.

- **What will happen to the results of the research study?**

The findings will be written up as part of Dr Larson's clinical psychology doctorate degree. In addition, we will publish any interesting findings in scientific journals. We will also send you copies of the results, if you would like, and will host an event at the University of Birmingham for those who would like to attend a talk about the results. This would be in the spring/summer of 2017.

- **Who has reviewed the study?**

The North of Scotland Research Ethics Committee (1) has reviewed the study and they consider it safe and ethical.

- **What happens if I have any further concerns?**

If you have any concerns about taking part, we encourage you to talk to other people you are close to about it, or contact the research team. Remember, you do not have to take part – your care and treatment will stay the same no matter what you decide.

If you would like to discuss any aspect of this research please contact:

Tel: 0121 414 7124

Email: fxl437@bham.ac.uk

Post: Dr Felicity Larson, School of Clinical Psychology, Department of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

PARTICIPANT INFORMATION SHEET (ASD-NP, v1.0)

UNIVERSITY OF BIRMINGHAM

Title of Project: The Birmingham Autism, Schizotypy, and Emotions Study (BASES)

Researchers: Dr Felicity Larson, Professor Stephen Wood, Dr Renate Renier, Dr Katie Chisholm

We would like to invite you to take part in our research study. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please read this information carefully and contact us if you have any questions. Our contact information in included on the second page. Reading this information sheet will take up to 10 minutes.

- **What is the purpose of this research?**

BASES is a project being run by Dr Felicity Larson as part of her clinical psychology doctorate degree at the University of Birmingham. This study is aimed at helping us understand why some people with autism spectrum disorder (ASD) suffer from a type of mental illness called psychosis, and what might be keeping other people with ASD well. We also want to understand if there are any differences between people who experience psychosis, depending if they have ASD or not. To answer these questions, we want to measure ASD traits, certain personality traits (known as schizotypy), and how people experience and cope with strong emotions.

- **Why have I been invited to take part?**

You have been invited because you are signed up to the Autism Research Centre (University of Cambridge) volunteer database. We are asking people with ASD who have no history of psychosis to help with our study. It is ok if you have experienced other mental health problems, such as depression or anxiety – you can still take part if you have had these experiences.

Psychosis is part of several different conditions – schizophrenia, bipolar disorder, schizoaffective disorder, delusional disorder, and others. If you have had a diagnosis of one of these conditions, we may still be able to include you – please contact the study team before taking part to discuss this further.

- **What will happen to me if I agree to take part?**

You will be asked to complete five questionnaires on-line, or if you do not have access to the internet, via pen and paper. This should take you between 30-45 minutes. Some of the questions may be similar to or the same as questionnaires you have completed before – this is ok.

- **What will happen to the information I give?**

Your answers to the questionnaires will be stored electronically in a database, along with the answers of other people who took part in the study. Your information will be identified by an anonymised code, in a file protected with a password, and will be kept separately from your

name and any other personal identifiable data about you. Paper files will be stored in a locked filing cabinet in a secure building. Only members of the research team will have access to your information.

- **What will happen if I do not want to carry on with the study?**

You do not have to take part in the research. If you start answering the questionnaires but change your mind, you do not have to continue. You do not have to give a reason why you do not wish to participate. Once you have given us your answers to the questionnaires, however, it will not be possible to change your mind.

- **Expenses and payments**

We cannot pay you for taking part in the study, but as a thank you for your time, you will have the chance to enter yourself into a prize draw for one of 3 £15 Amazon gift vouchers. The prize draw will take place once the study is complete, which will be no later than April 2017.

- **What will happen to the results of the research study?**

The findings will be written up as part of Dr Larson's clinical psychology doctorate degree. In addition, we will publish any interesting findings in scientific journals. We will also send you copies of the results, if you would like, and will host an event at the University of Birmingham for those who would like to attend a talk about the results. This would be in the spring/summer of 2017.

- **Who has reviewed the study?**

The North of Scotland Research Ethics Committee (1) has reviewed the study and they consider it safe and ethical.

- **What happens if I have any further concerns?**

If you have any concerns about taking part, we encourage you to talk to other people you are close to about it, or contact the research team. Remember, you do not have to take part – your care and treatment will stay the same no matter what you decide.

If you would like to discuss any aspect of this research please contact:

Tel: 0121 414 7124

Email: fxl437@bham.ac.uk

Post: Dr Felicity Larson, School of Clinical Psychology, Department of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

PARTICIPANT INFORMATION SHEET (HC, v1.0)

UNIVERSITY OF BIRMINGHAM

Title of Project: The Birmingham Autism, Schizotypy, and Emotions Study (BASES)

Researchers: Dr Felicity Larson, Professor Stephen Wood, Dr Renate Renier, Dr Katie Chisholm

We would like to invite you to take part in our research study. Before you decide, we would like you to understand why the research is being done and what it would involve for you. Please read this information carefully and contact us if you have any questions. Our contact information in included on the second page. Reading this information sheet will take up to 10 minutes.

- **What is the purpose of this research?**

BASES is a project being run by Dr Felicity Larson as part of her clinical psychology doctorate degree at the University of Birmingham. This study is aimed at helping us understand why some people with autism spectrum disorder (ASD) suffer from a type of mental illness called psychosis, and what might be keeping other people with ASD well. We also want to understand if there are any differences between people who experience psychosis, depending if they have ASD or not. To answer these questions, we want to measure ASD traits, certain personality traits (known as schizotypy), and how people experience and cope with strong emotions.

- **Why have I been invited to take part?**

You have been invited because we need individuals who have never experienced psychosis or bipolar disorder, and who do not have ASD or personality disorder, to compare the results of our clinical groups to. Psychosis is part of several different conditions – schizophrenia, bipolar disorder, schizoaffective disorder, delusional disorder, and others. It is ok if you have experienced other mental health problems, such as depression or anxiety – you can still take part if you have had these experiences.

- **What will happen to me if I agree to take part?**

You will be asked to complete five questionnaires on-line. This should take you between 30-45 minutes.

- **What will happen to the information I give?**

Your answers to the questionnaires will be stored electronically in a database, along with the answers of other people who took part in the study. Your information will be identified by an anonymised code, in a file protected with a password, and will be kept separately from your name and any other personal identifiable data about you. Paper files will be stored in a locked filing cabinet in a secure building. Only members of the research team will have access to your information.

- **What will happen if I do not want to carry on with the study?**

You do not have to take part in the research. If you start answering the questionnaires but change your mind, you do not have to continue. You do not have to give a reason why you do not wish to participate. Once you have given us your answers to the questionnaires, however, it will not be possible to change your mind.

- **Expenses and payments**

We cannot pay you for taking part in the study, but as a thank you for your time, you will have the chance to enter yourself into a prize draw for one of 3 £15 Amazon gift vouchers. The prize draw will take place once the study is complete, which will be no later than April 2017.

- **What will happen to the results of the research study?**

The findings will be written up as part of Dr Larson's clinical psychology doctorate degree. In addition, we will publish any interesting findings in scientific journals. We will also send you copies of the results, if you would like, and will host an event at the University of Birmingham for those who would like to attend a talk about the results. This would be in the spring/summer of 2017.

- **Who has reviewed the study?**

The North of Scotland Research Ethics Committee (1) has reviewed the study and they consider it safe and ethical.

- **What happens if I have any further concerns?**

If you have any concerns about taking part, we encourage you to talk to other people you are close to about it, or contact the research team. Remember, you do not have to take part – your care and treatment will stay the same no matter what you decide.

If you would like to discuss any aspect of this research please contact:

Post: Dr Felicity Larson, School of Clinical Psychology, Department of Psychology, University of Birmingham, Edgbaston, Birmingham, B15 2TT.

Appendix 6 – Consent Form

CONSENT FORM

Participant Identification Number:.....

UNIVERSITY OF BIRMINGHAM

CONSENT FORM

Title of Project: The Birmingham Autism, Schizotypy, and Emotions Study (BASES)

Researcher: Dr Felicity Larson, Professor Stephen Wood, Dr Renate Reniers, Dr Katherine Chisholm

Please tick each box if you agree:

1. I confirm that I have understood the information sheet dated ..... (version ...) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I can stop at any time, without giving any reason, without my own or my loved one's medical/social care or legal rights being affected. ☐

3. I understand that once I have submitted my responses, it will not be possible to withdraw from the study. ☐

4. I understand that the data collected during this study will be looked at by the researcher and relevant others at the University of Birmingham to ensure that the analysis is a fair and reasonable representation of the data. ☐

5. I agree to take part in the above study. ☐

.....	.....	.....
Name of participant	Date	Signature

Appendix 7 – ARC Invitation E-mails

ARC recruitment e-mail, v1.0, 09/09/2015

WHY ARE SOME PEOPLE WITH AUTISM AT RISK OF DEVELOPING PYSCHOSIS?

Dr Felicity Larson and colleagues at the University of Birmingham are looking for volunteers to take part in an on-line study investigating why some people on the autism spectrum develop a mental health problem called psychosis and why others do not. We think that the way people experience emotions might be part of the answer, and also certain personality traits.

We are looking for men and women on the autism spectrum who are over the age of 18 and who have **not** experienced psychosis. This means that if you have a diagnosis of schizophrenia, bi-polar disorder, or other psychosis, including hearing voices that others do not hear or experiencing visual hallucinations/having visions, you would not be able to take part.

The study involves visiting our website to answer some questions about yourself (website URL) and how you feel in different situations. It will take up to 45 minutes to complete. As a thank you, you can choose to be entered into a prize draw for one of three £15 Amazon gift cards.

To find out more about the study, please visit our website (website URL). If you would like to participate in the study or if you have any questions, please contact Felicity at fxl437@bham.ac.uk, or phone 0121 414 7124 to leave her a message so she can ring you back.

WHY ARE SOME PEOPLE WITH AUTISM AT RISK OF DEVELOPING PYSCHOSIS?

Dr Felicity Larson and colleagues at the University of Birmingham are looking for volunteers to take part in an on-line study investigating why some people on the autism spectrum develop a mental health problem called psychosis and why others do not. We think that the way people experience emotions might be part of the answer, and also certain personality traits.

We are looking for men and women living in the UK with a diagnosis of an autism spectrum condition who are over the age of 18 and who have experienced psychosis. This means having a diagnosis of schizophrenia, bi-polar disorder, or other psychosis, including hearing voices that others do not hear or experiencing visual hallucinations/having visions. We are looking for people who have had help from mental health professionals due to their psychosis.

The study involves being sent some information to read and then completing a telephone interview about your mental health experiences, which will take up to one hour. If you meet our criteria, you will be given a link to our website to answer some questions about yourself and how you feel in different situations. These questionnaires will take up to 45 minutes to complete. As a thank you, you can choose to be entered into a prize draw for one of three £15 Amazon gift cards.

To find out more about the study or if you would like to participate in the study, please contact Felicity [redacted] to leave her a message so she can ring you back.

Appendix 8 – Facebook advertisement text

Social media advert for healthy control group, 03/01/2017, v.1.0

Are you interested in helping with research? Do you have time to complete an on-line survey that will take approximately 45 minutes? Would you like to be entered to win an Amazon voucher worth £15? We are seeking individuals with no history of diagnosis with autism spectrum disorder, psychosis, bipolar disorder, or personality disorder to take part in an on-line study investigating emotional regulation and autistic traits, and their link to serious mental illness. If you would like to find out more, please click the link to read the study information sheet.