Resilience as a Multimodal Dynamic Process

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Abstract

Aim

Resilience is rapidly gaining momentum in mental health literature. It provides a new understanding of the highly variable trajectories of mental illness, and has consistently been linked with improved mental health outcomes. The present review aims to clarify the definition of resilience, and to discuss new directions for the field.

Methods

After discussing the definition of resilience, this narrative review synthesises evidence which identifies the specific protective factors involved in this process. This review also addresses the mechanisms which underlie resilience.

Results

Recent literature has clarified the three core components of resilience, which are: the presence of an adversity or specific risk for mental illness; the influence of protective factors which supersede this risk; and finally, a subsequently more positive outcome than expected. Now that these are largely agreed upon, the field should move on to addressing other topics. Resilience is a dynamic process by which individuals utilise protective factors and resources to their benefit. It can vary within one individual across time and circumstance. It can also refer to good functional outcomes in the context of diagnosable illness. While previous research has focused on psychological resilience, it is essential that resilience is conceptualised across modalities.

Conclusions

The field should move towards the development of a multimodal model of resilience. Researchers should now focus on producing empirical research which clarifies the specific protective factors and mechanisms of the process, aligning with the core concepts of resilience. This growing, more homogeneous evidence base can then inform new intervention strategies.

Keywords: Resilience; Protective Factors; Risk; Psychiatric illness; Psychopathology

Introduction

Not all individuals exposed to the same risk factors for psychiatric illness have identical subsequent trajectories. One potential reason for this is that they have differing levels of *resilience*, or varied ways in which they are able to utilise personal or environmental resources to their benefit. Understanding the basis of resilience will inform new strategies to promote and strengthen those factors in others who are at risk of experiencing a first-episode of psychiatric illness. Evidence suggests that resilience is higher in healthy individuals when compared to patients. For example, individuals identified as being at Clinical High Risk (CHR) for psychosis (Marulanda & Addington, 2016) and individuals with a schizophrenia-spectrum disorder (Bozikas et al., 2016) scored significantly lower on self-report measures of resilience than healthy controls. However, studies which compare resilience in patients and healthy controls often do not account for exposure to risk, an important consideration for resilience research. Other studies, therefore, have examined levels of resilience within patient groups. Kim et al. (2013) identified that resilience was lower in individuals at CHR who ultimately made a transition to frank psychosis than those who did not. Furthermore, in their sample of patients with schizophrenia-spectrum disorder, Bozikas et al. (2016) identified that patients with higher resilience also presented with better functioning. Together, findings like these indicate that higher resilience may have a protective effect against the development, or long-term effects, of mental illnesses.

While the current evidence clearly demonstrates the value of the resilience concept in mental health research, the field is still hindered by a number of theoretical and methodological issues. As such, the aims for the present review are as follows:

1. To discuss a consensus definition of resilience and attempt to define related terminology.
2. To provide evidence that resilience is a dynamic process.
3. To provide an updated examination of the literature which examines the specific, multimodal protective factors involved in resilience to mental illness.
4. To identify the mechanisms which support engagement in the resilience process.
5. Finally, to discuss further limitations and future directions for the field.

Definitions of Resilience

Previously, resilience has not been well defined, which has affected the validity and progression of research within the topic (Davydov, Stewart, Ritchie, & Chaudieu, 2010). More recently, several extensive reviews have attempted to provide a definition which encapsulates all aspects of the resilience concept (see Table 1). Despite this, the idea that resilience remains an undefined concept still influences the narrative of resilience research.

Table 1 about here

Many of the recent definitions listed in Table 1, however, appear to be fundamentally similar, something that has been recognised for a number of years (Herrman et al., 2011). Present definitions converge around three main factors: first, the presence of an adversity or specific risk for the development of mental illness; second, the influence of protective factors which supersede this risk; and finally, a more positive outcome than might be expected in the context of such a risk (Fletcher & Sarkar, 2013; Windle, 2011). While authors differ slightly in their wording of this definition, there is a fundamental agreement as to the core components of resilience. Importantly, these definitions also move away from the idea that resilience is merely the opposite of risk, or the absence of symptoms (Bonanno, 2004). Instead, resilience is an additional, active process which is distinctive from risk. This definition of resilience allows the identification of factors which can be strengthened to improve long term outcomes for "at-risk" individuals. While it is difficult to reduce resilience to one simple operationalisation, moving forwards it is essential that researchers conceptualise resilience using these three core features, and do not conflate resilience with the opposite of risk. Not only will this strengthen the validity of the concept, but it also makes studies more comparable, providing a more solid base of knowledge to inform clinicians. It would now be more beneficial to the resilience field for researchers to move their focus from defining the concept to alternative issues which remain.

There are several related concepts involved in resilience which are also important to define. The present review, informed by the definitions of Table 1, identifies resilience as a dynamic process. The process of resilience is characterised by utilising the protective factors available to one's advantage,

thus leading to better outcomes than would be expected within the context of a specific risk for mental illness. This review conceptualises "protective factors" as any personal or environmental factors which are of benefit to the individual's mental health or long-term functioning. Protective factors represent more than simply a lack of risk factors. Furthermore, they are not static. Analogous to the concept of 'fluid risk' (Bell, 1992), an individual's access to, or the strength of, these protective factors may fluctuate throughout their lifetime, further underscoring the dynamic aspect of the resilience process. This review also explores the "mechanisms' involved in the resilience process. Mechanisms refer to the underlying process by which a protective factor exerts a positive effect on an individual's mental health or long-term functioning. Mechanisms may function by moderating a risk factor, or mediating the effect of the risk factor on a long-term outcome. These concepts will be explored in further detail throughout this review.

Resilience as a Dynamic Process

One debate in the field has been whether resilience should be considered a 'trait' phenomenon, which is stable and enduring across all risks, or a 'state' phenomenon which is dynamic and changeable (Hu, Zhang, & Wang, 2015; Rutter, 2012). The first investigations of resilience focused on "ego resilience", identifying resilient individuals, who had comparatively improved outcomes in the face of risks or adversities (Block & Block, 1980). The suggested "ego-resilient" person is already resourceful before they encounter an adversity, and their resilient characteristics can be observed even in childhood. Such definitions of resilience as a stable and enduring construct have begun to explain individual differences in response to risk.

It is noteworthy that recent definitions (Table 1) extend this concept of an a priori given resilience and focus on the dynamic aspects of the concept. They highlight resilience as a process, as opposed to a static or stable trait. These definitions conceptualise resilience as the process by which individuals adapt to unfavourable circumstances, as opposed to the characteristics of the individual themselves (Luthar & Cicchetti, 2000). Fergus and Zimmerman (2005) separated the components of resilience into 'assets' and 'resources'. Assets refer to the personality characteristics discussed in earlier

definitions such as competence or coping skills (which may or may not be static traits). Resources consider protective factors which are external to the individual, such as family support or community organisations. The *process* of resilience refers to the utilisation of both assets and resources for a favourable outcome (Fergus & Zimmerman, 2005). It is also important to consider the physical state as an additional factor which influences one's ability to utilise these assets and resources. For example, changes to physical health may affect and individual's ability to understand and engage with these elements. This further underscores the dynamic aspect of the resilience process, which results from a complex interaction between personal and environmental factors which are always subject to change.

Moreover, resilience may be dynamic within a single individual, fluctuating across circumstances and as a function of time. For example, an individual may be proficient in one area of life such as academic skills, but struggle with social skills. Luthar, Cicchetti, and Becker (2000) highlight this idea as a fundamental principle of the concept. They state that, while we may expect to see similar levels of resilience in similar domains, we cannot expect one individual to demonstrate resilient outcomes in all areas, and at all times, of their life. Arguably, it is important to encourage the idea that resilience will fluctuate. As an individual navigates their life, not all assets or strategies will be useful in every circumstance (Rutter, 2012). If individuals are encouraged to utilise a range of strategies for different problems across their lifespan, they will be more equipped to deal with new problems, and changes they face due to ageing or circumstance. It is also important to remember that resilience is not impenetrable. If the presence of risk factors increases to an overwhelming level, any individual may experience the onset, or detrimental effects, of disorder. The purpose of resilience research is not to stigmatise, but to provide a new perspective on the highly variable trajectories of mental health and wellbeing.

The conception of resilience as a process suggests that it is possible for anyone to be taught to engage in this process, by utilising whichever protective factors may be available to them. This outlook informs intervention strategies in two ways: firstly, that protective factors associated with more favourable outcomes should be strengthened individuals experiencing, or at risk for, mental illness. In the long-term, it would also be these specific factors which could be transformed into larger public

health interventions, with the aim of reducing the global burden of mental illness. Secondly, that it is important to understand the way individuals may engage with these resources to their benefit.

Due to the presence of many extensive, high quality reviews in the field, the core components of resilience are now largely agreed upon. Future research should now focus on identifying the specific, multimodal, protective factors involved in resilience. It is critical that these protective factors are conceptualised from a multimodal perspective. Mental health has numerous influences including the psychological, biological/neurobiological, genetic, and neurocognitive. Resilience research, therefore, should reflect the dynamic nature of mental health and illness. The examination of resilience in other domains can only strengthen the validity of the concept. Importantly, research should also attempt to understand the mechanisms which underlie people's engagement in this process. It is not enough that people possess protective factors, they must also understand how to utilise them to their benefit, and in which circumstances this will be most appropriate.

Psychological and Social Protective factors

The majority of research examining protective factors in resilience focuses on possible psychological or social factors. Various potential psychological factors have been identified in the literature, with reviews highlighting factors such as hardiness (Bonanno, 2004) and optimism (Fletcher & Sarkar, 2013; Lee et al., 2013a). Southwick et al. (2016) stressed the importance of social support as a protective factor, identifying the various beneficial aspects such as the size and quality of an individual's social network, and the frequency of social interactions. Southwick et al. (2016) suggest that social support may be related to resilience through a number of intermediary mechanisms, such as the motivation to reduce risky behaviours. In a qualitative study examining individuals' experience of First-Episode Psychosis, Henderson (2015) identified two types of resilience: "Tenacity", which involved the input of effort over time, and "Rebounding", meaning springing back or continuing with life. Self-esteem, quality of life, and spirituality also positively correlated with higher scores on a self-report scale of psychological resilience in patients with schizophrenia and bipolar disorder (BD; Mizuno et al., 2016a).

Empirical methods have also been used to determine the psychological factors involved in resilience. In an observation of individuals who retained healthy functioning despite exposure to trauma, In their regression model 'purpose in life' significantly predicted 'resilient' versus 'currently ill' status (Alim et al., 2008). Additionally, Harris, Brett, Starr, Deary, and McIntosh (2016) examined protective factors, evident in early life, which predicted adult resilience. In this birth cohort study, an array of risk and protective factors were assessed in early life, with self-report resilience subsequently assessed after approximately 66 years. Interestingly, they found that adolescent dependability (higher teacher ratings on personality characteristics such as 'conscientiousness' and 'desire to excel) and childhood illness (number of serious illnesses during childhood) significantly predicted lower adult resilience scores. A higher number of stressors (such as house moves or parent separation or death) in early life predicted higher adult resilience. The authors suggest that developing a healthy stress reaction requires an initial exposure to stress, which has an inoculating effect. In turn, higher resilience scores were related to higher scores on measures of physical health, mental health, and wellbeing (Harris et al., 2016). Collishaw et al. (2016) studied mental health outcomes in the adolescent offspring of parents with depression over a period of four years. Approximately 20% of their sample retained good long term mental health, despite their established genetic risk for depression. Factors such as support from co-parents, good quality social relationships, and self-efficacy all predicted better sustained mental health. They also identified that the presence of multiple protective factors was required to sustain good mental health over time. This may be particularly informative if effective intervention requires the strengthening of a protective network.

Using these results, researchers have also attempted to build a model of psychological resilience. It is often suggested that resilience occurs across three distinctive domains, characterised by Windle (2011) as Individual, Social, and Cultural. Friborg (2005) further divided resilience into five reliable subdomains. The broader 'individual' domain includes 'personal competence' factors, such as self-esteem and determination, 'social competence' factors, including extraversion and social adeptness, and 'personal structure', including ability to uphold routines and organisation. The broader 'family' domain referred to 'family coherence', the amount of family conflict or co-operation, support, and stability.

Finally, the 'external support systems' domain referred to access to external support from friends and family. Much of this research into psychological and social protective factors is similar to the approach of Fergus and Zimmerman (2005), highlighting specific resources which are available to be utilised in the resilience process.

Neurobiological Protective Factors

In order to understand how resilience might function across domains, we can consider possible neurobiological differences between individuals with differing mental health outcomes. This approach enables the identification of neurobiological differences, or potentially compensatory brain changes in response to risk, and would further our understanding of the variable outcomes in at-risk populations. Amico et al. (2011) compared individuals with Major Depressive Disorder (MDD), healthy controls with no family history of psychopathology (FHN), and healthy controls with a positive family history of MDD (FHP). The FHP group was considered resilient as despite their relatively high genetic risk, they had not developed the disorder, and displayed significantly larger volumes of the dorsomedial prefrontal cortex compared to both other groups. This could suggest that increased volumes of this particular area are associated with resilience.

In a similar design, Frangou (2011) identified increased volumes of the vermis, and increased connectivity between the ventral and dorsal prefrontal cortex, as markers of resilience to BD. These structural and connective patterns were distinct to first-degree relatives of BD patients when compared to their family members with BD and healthy controls. The family members without psychopathology did express neurological markers of their genetic risk for BD; however, they also demonstrated these additional changes which to the authors hypothesised helped overcome that risk. In another study of resilience to BD, Dima (2016) presented BD patients, asymptomatic first-degree relatives of BD patients, and healthy controls, with a task to measure facial affect processing. They identified that frontolimbic dysfunction characterised risk for BD and diffuse hypoconnectivity of the working memory network was related to disease expression. Asymptomatic relatives, however, evidenced an additional hyperconnectivity within the ventral visual stream, which the authors conclude to represent

a marker of resilience to BD. Finally, Peterson et al. (2014) sought to identify specific endophenotypes of risk and resilience for MDD. The risk endophenotype was characterised by greater activation of cortical attention circuits, whereas resilience was characterised by greater activation of the dorsal anterior cingulate cortex (dACC). Activation of the dACC has also been found to correlate with increased self-report psychological resilience in healthy adults (Kong, Wang, Hu, & Liu, 2015). Additionally, increased volumes of the anterior cingulate cortex have also been related to increased optimism in health older adults (Chowdhury, Sharot, Wolfe, Duzel, & Dolan, 2014). These results provide an initial understanding of the potential biological protective factors involved in resilience to mental illnesses.

Genetic Protective Factors

Evidence also suggests a genetic component to the resilience process. In a study of boys who had experienced maltreatment, Caspi et al. (2002) identified that resilience may result from genes which indicate higher MAOA expression. Compared to those who had the lower activity version of the same gene, high MAOA expression was related to significantly lower levels of antisocial behaviour, a common outcome following childhood maltreatment. In two independent samples, specific polymorphisms of the CRHR1 gene were found to moderate the effect of child abuse on adult depression with a protective effect (Bradley et al., 2008). In the Dunedin Birth Cohort, a polymorphism of the 5-HTT gene conferred resilience to depression (Caspi et al., 2003). In their sample, carrying two long (‘l’) alleles of the gene reduced the effect of life events upon depressive symptoms when compared to individuals carrying at least one short (‘s’) allele of the gene. The same effect was observed for increases in depressive symptoms, suicide ideation/ attempts, and for the effect of childhood maltreatment on depression. These results could indicate that while carrying the s allele of the 5-HTT gene confers a risk for depression, carrying the l allele could indicate resilience to depression. Additionally, the long allele of 5-HTTLPR polymorphism has been associated with increased emotional resilience in college students (Stein, Campbell-Sills, & Gelernter, 2009).

It is important to note, however, that these are not simple cause and effect relationships between the gene and a resilient outcome. It is highly unlikely that one gene alone will underlie resilience. More likely, a cluster of genes will interact to produce such an outcome. Additionally, there is likely a highly complex relationship between genetics, environment, and life experience which altogether predicts an individual's trajectory or outcome.

Neurocognitive Protective Factors

There is also evidence that neurocognitive ability could be an important consideration when studying resilience. Neurocognitive deficits appear to be marked and longstanding in many mental illnesses such as depression (Marazziti, Consoli, Picchetti, Carlini, & Faravelli, 2010; Veiel, 1997) and psychosis (Fioravanti, 2012; O'Carroll, 2000). However, at present it is difficult to isolate neurocognitive protective factors, due to the current sparsity of research in this area. There have been some investigations of this relationship, with tentative suggestions of a positive correlation between cognitive ability and resilience. Results presented here are intended to highlight the potential benefit of investigating neurocognition as a protective factor, however, further empirical evidence is required in order to form conclusions regarding the role of neurocognition in the resilience process.

There are several studies which demonstrate this link. For example, in the Dunedin Birth Cohort, neurocognitive performance at the age of seven was found to prospectively differentiate individuals who would develop a schizophrenia spectrum disorder in adulthood (Koenen et al., 2009). For each standard deviation increase in childhood IQ, the individual was found to have a 42% reduction in the odds of receiving a lifetime schizophrenia spectrum diagnosis. Such a differentiation was also seen for individuals who would receive a diagnosis of adult depression or anxiety disorders, and was associated with persistence of depression and likelihood of comorbidity (Koenen et al., 2009). In this study, odds of receiving an adult diagnosis continued to reduce along the whole range of IQ scores. It is possible, therefore, that one could consider a continuum by which deficits in IQ relate to risk, but *above average* IQ score adds additional protection. These results demonstrate that individuals with better performance on neurocognitive measures are less likely to receive diagnoses of mental illness in

adulthood. In addition, better neurocognitive performance is consistently linked with improved social and role functioning (Lee et al., 2013b; Lin et al., 2011; Meyer et al., 2014) independent of clinical symptoms (Carrión et al., 2011; Lee et al., 2015). As such, these results indicate that neurocognition warrants further investigation in terms of its potential as a protective mechanism which may be utilised in the resilience process.

Wingo, Fani, Bradley, and Ressler (2010) investigated resilience to traumatic life events, in a sample of 226 traumatised individuals. They compared neuropsychological performance in individuals who had, or had not, developed psychopathology following exposure to trauma. They identified comparable performance between the two groups on measures of verbal reasoning, nonverbal reasoning, and verbal memory. However, individuals classified as resilient exhibited better baseline performance on tests of nonverbal memory than those classified as non-resilient, an effect which remained after adjustment for severity of childhood abuse, exposure to other trauma, gender, and race. Furthermore, Genet and Siemer (2011) found that cognitive flexibility, the ability to inhibit or switch attention, and flexible processing of affective stimuli predicted higher scores on two scales of trait resilience. In their sample of undergraduate students, higher scores of trait resilience were associated with better performance on tasks of cognitive flexibility involving both neutral and emotionally weighted stimuli. Finally, in a cohort study of male soldiers, higher trait resilience was linked to higher scores on measures of attentional control (Schafer et al., 2015). Again, these results all demonstrate patterns of neurocognitive performance which are distinct to individuals who are thought to be engaging the resilience process. At present, we cannot be certain of the role that neurocognition plays in the resilience process as investigations have been hindered by methodological limitations such as a lack of control group. Therefore, further research in this area will be essential moving forwards.

Mechanisms of the Resilience Process

It is crucial that research explores the mechanisms which underlie the resilience process, and develops an understanding of how individuals engage with protective factors and utilise them to overcome a risk or adversity. In relation to resilience, a mechanism may refer to the process by which

a protective factor either mediates or moderates the effect of risk on long-term outcomes. Positive appraisal style has been proposed as one such cognitive mechanism. Kalisch, Muller, and Tuscher (2015) propose that by classifying situations positively, reappraising where necessary, and avoiding interference by negative stimuli, individuals may overcome the effects of stress. As such, a positive appraisal style may mediate the effect of stress on long-term mental health and wellbeing.

Additionally, there may be genetic mechanisms underlying the resilience process. The Differential-Susceptibility Hypothesis suggests that individuals who carry the "vulnerability" allele of a gene may in fact react better to positive child rearing than those carrying the "protective" allele. This "vulnerability" allele may in fact mean that they are more sensitive to the effects of their environment, whether positive *or* negative (Bowes & Jaffee, 2013; Davydov et al., 2010). Intervention for such individuals may be more effective, informing clinicians that "high-risk" cases should be the primary target for intervention. Such results provide an indication of how genetic mechanisms may influence resilience.

It has also been hypothesised that resilience may result from the experience of prior stresses or adversities. Circumstances which are stressful enough to challenge, but not overwhelm, the individual, can provide the opportunity to learn skills or identify attributes which can help the individual to overcome future risks (Harris et al., 2016). Often termed an "inoculating" or "steeling" effect, this means that when faced with future risks or adversities, the individual can draw on their prior experience and employ strategies which assisted them with past stresses (Southwick et al., 2016). In a study of monkeys, Katz et al. (2009) identified that those who had experienced the stress of intermittent separation from their natal group had larger prefrontal cortical volumes than those who had experienced no stress. As such, they suggested that this inoculation is exerted through the mediating effect of increased myelination of white matter in the prefrontal cortex (Katz et al., 2009; Lyons, Parker, Katz, & Schatzberg, 2009), which then promote enduring adaptations to behaviour (Lyons et al., 2009).

This research provides us with some ideas about the potential mechanisms underlying resilience. Ultimately, it reinforces resilience as a highly dynamic process which may vary according

to time and circumstance. In addition, as suggested by Fergus and Zimmerman (2005), protective factors may vary in their usefulness in relation to particular risk circumstances, meaning the individual must decide how and when to utilise these resources. Further research in this area is required for us to truly understand how resilience works.

Limitations and Directions for Future Research

There are a number of methodological limitations in the resilience field which limit ability to draw conclusions. Firstly, studies which have aimed to identify the protective factors involved in the resilience process have been largely cross-sectional. These studies have provided us with an insight into the potential protective factors involved in the resilience process; however, longitudinal follow-up and prospective reports are vital to understanding the full potential of the resilience concept.

Researchers have argued that the present resilience literature is highly heterogeneous (Mizuno, Wartelsteiner, & Frajo-Apor, 2016b) and thus resists comparison. For example, Bozikas et al. (2016) operationalised resilience as higher scores on a self-report scale of the construct. Frangou (2011), however, operationalised resilience as applying to individuals who had a genetic risk for BD who had not developed the disorder. Both approaches have merit, and use the definition of resilience outlined in this review; however, their outcome measures are very different which limits comparability. A clear statement regarding the type of resilience which is being examined (for example "self-report psychological resilience", or "observed resilience to genetic risk") should be made, allowing for more direct comparisons between studies using similar methodologies. This would make the resilience field more transparent, and thus informative for intervention strategies.

While definitions of resilience appear to have reached some stability, this is not to suggest that remaining debate around this concept would be obsolete. For example, as noted by Windle (2011), there is not yet a consensus on what would constitute a 'positive' outcome in resilience. Some authors would argue that the individual would need to 'flourish' after adversity, reaching levels of functioning which are superior to their premorbid state (Joseph & Linley, 2006). However, other researchers would argue

that resilience is better reflected by generally stable functioning despite risk or adversity (Bonanno, 2004).

There are a number of ways in which the methodology of future research could improve the validity of the field. One suggestion would be to examine "observable" resilience. Studies already mentioned including those of Collishaw et al. (2016), Wingo et al. (2010), and Frangou (2011) examined their protective factors of interest by comparing individuals with, or without, good functioning in the context of risk. Additionally, the use of a control group by researchers such as Frangou (2011), allows for the identification of protective factors which are distinctive to individuals who are functioning well in the face of adversity, as opposed individuals who have low exposure to risk factors. In addition, birth cohort studies such as those of Koenen et al. (2009) and Harris et al. (2016) allow for the assessment of the same individuals at multiple time points longitudinally. Protective factors can then be prospectively identified by examining the baseline characteristics of the same individuals who ultimately exhibit good or poor functional outcomes in the long-term. Use of these methodologies would aid the field in its progression towards the identification of specific protective factors involved in resilience.

Transdiagnostic research is also important in the resilience field. Resilience research has tended to focus on identifying protective factors in relation to specific diagnoses. Future research should focus on factors which are present across, as well as within, diagnoses, to identify variables which are protective against the development of psychopathology more generally. This would be useful for a number of reasons. Certain experiences may be a risk factor for multiple mental illnesses, such as experience of violence which may increase the likelihood of developing PTSD, depression, or substance abuse/ dependence (Kilpatrick et al., 2003). The identification of cross-diagnostic protective factors would allow the promotion of these in instances where a non-specific risk has been experienced by an individual. Similarly, while fulfilling the operationalised Ultra-High Risk criteria predicts an increased risk of transition to psychosis (Yung, 2003), individuals in this group can also experience a number of other mental illnesses (Haroun, Dunn, Haroun, & Cadenhead, 2006; Lin, 2014). Identifying protective factors which function across diagnoses could be promoted in this group to reduce the chances of

developing other psychopathologies. There is also increasing dissatisfaction with the current diagnostic system which categorises individuals with highly heterogeneous experiences into the same disorder (Kalisch et al., 2015). Therefore, further work identifying resilience which is not disorder-specific will help to identify how individuals are protected from particular outcomes, without reliance on the current system. Such "general" resilience mechanisms may also represent a more efficient intervention strategy (Kalisch et al., 2015). Additionally, this type of research could be used to form the basis of larger public health interventions to reduce the global burden of mental illness more generally.

Finally, the goal for future research should be to create a model of resilience which functions across modalities, and identifies how different protective factors interact to predict better outcomes in the context of risk. This would be done by building an extensive base of empirical studies which operationalise resilience in the same way; as a dynamic process by which individuals utilise protective factors to overcome risk for mental illness.

Conclusion

Research into the resilience process provides an exciting opportunity to highlight protective factors, which could be strengthened to provide better long-term outcomes for individuals at risk of mental illness. The definition of resilience is widely accepted as representing the presence of additional protective factors which counteract this risk, ultimately leading to more positive long-term outcomes; however, the idea that resilience is a poorly defined concept is still present in the field. Remaining debates do surround resilience; however, the core concepts are now largely agreed upon. Future research should focus on empirical studies which examine the long-term effects of multimodal protective factors, and the mechanisms which underlie them. This growing, more homogeneous, evidence base could then be used to trial new intervention strategies targeted at individuals who are identified as being at-risk for mental illness. In the long-term, resilience could also prove useful in large scale public health interventions which attempt to improve mental health outcomes more globally.

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Conflicts of Interest

The named authors have no conflicts of interest to disclose.

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Table 1
Definitions of Resilience

*"Resilience is the process of effectively negotiating, **adapting** to, or managing significant sources of stress or trauma."* (Windle, 2011)
*"Healthy, **adaptive**, or integrated positive functioning over the passage of time in the aftermath of adversity."* (Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014)
*"Most definitions are based around the two core concepts of adversity and positive **adaptation**"* (Fletcher & Sarkar, 2013)
*"In the context of exposure to significant adversity, resilience is both the capacity of individuals to **navigate** their way to the psychological, social, cultural, and physical resources that sustain their wellbeing, and their capacity individually and collectively to **negotiate** for these resources to be provided and experienced in culturally meaningful ways"* (Ungar, 2011)
*"Resilience is a **dynamic** capability which can allow people to thrive on challenges given appropriate social and personal contexts."* (Howe, Smajdor, & Stockl, 2012)
*"The term resilience is used in the literature for different phenomena ranging from prevention of mental health disturbance to successful **adaptation** and swift recovery after experiencing life adversities, and may also include post-traumatic psychological growth."* (Rutten et al., 2013)
*"Resilience is an **interactive** concept that is concerned with the combination of serious risk experiences and a relatively positive psychological outcome despite those experiences."* (Rutter, 2006)
*"Resilience appears to be a common phenomenon that results in most cases from the operation of basic human **adaptational systems**. If those systems are protected and in good working order, development is robust even in the face of severe adversity."* *(Masten, 2001)*