

IMPULSIVITY IN ANXIETY DISORDERS. A CRITICAL REVIEW

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SUMMARY

Background: Anxiety symptoms and disorders are common. High comorbidity between anxiety and other psychiatric disorders has been observed in community. Still, the relationship between impulsivity and anxiety disorders is controversial and not well explored.

Material and methods: The aim of this paper is to review measures of trait impulsivity in anxiety disorders. A literature review of the theoretical bases of the relationship between anxiety disorders and impulsivity is presented.

Results: Impulsivity is a key feature of numerous psychiatric disorders. Traditional conceptualizations suggest that impulsivity might display a negative relationship with anxiety. However, an association of impulsivity in patients with anxiety disorders is present. Some studies support proposition that anxiety may influence impulsivity in individuals with predisposition toward behavioural disinhibition.

Conclusion: There is a link between anxiety and impulsivity in psychiatric patients characterized by problems with impulse control (e.g. pathological gambling, self-harming behaviour, eating disorders), mood disorders and anxiety disorders. Behavioural and pharmacological interventions for decreasing impulsivity may effectively be used in the treatment.

Key words: impulsivity - anxiety disorders - BIS-11 - serotonin

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INTRODUCTION

The notion that impulsivity may play role in pathogenesis of neuropsychiatric disorders is common. Impulsivity was investigated in a wide range of mental disorders (e.g. affective disorders, personality disorders, alcohol dependence, attention deficit hyperactivity disorder, bulimia nervosa). Despite the widespread use the concept of impulsivity is poorly defined. According to Moeller "impulsivity is a predisposition to have rapid and unplanned reactions to internal and external stimuli without regard to the negative consequences of these reactions to individuals and others" (Moeller 2001). According to Eysenck extroverted impulsivity implies a decision making process in which the consequences and risk are taken into account, while psychotic impulsivity does not consider the risk of a decision (Eysenck 1985). Classifying a subject as "impulsive" can have different meanings depending on the dimension measured. Furthermore the different facets of impulsivity are not strongly correlated, what is well visible in association between self-report and behavioural measures of impulsivity (Newman 2014). Data from twin studies confirm a genetic component of impulsivity. Genetic contributions to impulsivity are mediated through neurotransmitter system especially serotonin and dopamine (Piero 2010).

Impulsivity is a multifactorial construct. It is supposed to be a stable personality trait. Impulsivity has two components being state and trait dependent. The trait dependent impulsivity is usually measured. Barratt Impulsiveness Scale (BIS-11) is the most common tool used for the impulsivity assessment in both clinical and not clinical populations. The BIS-11 is a 30-item self-report questionnaire, rated on a scale of 1 to 4. The scale

assesses impulsive thoughts and behaviour. The BIS-11 final version assessed three dimensions of impulsiveness: attentional, motor and non-planning (Vasconcelos 2012). An overall score is determined by summing up all the items. The higher the score, the higher the level of impulsiveness (Patton 1995, Summerfeldt 2004, Vasconcelos 2012). It is important to assess all subscales to characterize individual general level of impulsiveness (Stanford 2009). BIS-11 total scores between 52-71 are within normal limits for impulsiveness. Scores lower than 52 are typical for people who did not honestly complete questionnaire or are extremely over-controlled (Stanford 2009). Attentional impulsiveness is defined as the inability to focus on the ongoing task and cognitive instability, non-planning impulsiveness is seen as the inability to plan and think carefully, orientation towards the present rather than to the future and included self-control, motor impulsiveness characterizes acting on the spur of the moment (without inhibition) and perseverance (Taylor 2008, Vasconcelos 2012).

There are two commonly identified behavioural manifestations of impulsivity: inability to delay gratification (leading to an increased tendency to choose immediate small rewards over larger delayed ones) and response inhibition being the inability to conform responses to environmental context (leading to errors of commission on tests that required careful checking of stimuli) (Swann 2002).

Behavioural measures of impulsivity include: neuro-cognitive tasks e.g.: go/no go task, stop-signal task, commission errors, hit reaction time (versions of Continuous Performance Test) and Iowa Gambling Task. Continuous Performance Test is an attention paradigm and Iowa Gambling Task is referred to as a decision making task (Newman 2014).

Although both self-report and behavioural measures of impulsivity were studied in separate research contexts they are rarely used together in the same study and relatively little is known about their relation to each other (Reynolds 2006). Impulsivity in general is related to the process of attention and executive functions (Stanford 2009). However, there are mixed findings between impulsivity and executive functions (Kam 2012). The prefrontal cortex is considered most involved in executive control including cognitive control, decision making, planning. The most important connection involves areas of prefrontal cortex and amygdala. If neural networks works a motivation to act rashly based on arousal from limbic system is inhibited by communication from within the prefrontal cortex (Neto 2011). Prefrontal areas and amygdala are the part of neuro-anatomical circuit of conditioned fear (Neto 2011). Problems with the control of information processing or executive functioning may lead to impulsive behaviours. Patients with executive functions deficit score higher on the BIS-11 (Stanford 2009). Executive inhibitory dyscontrol underlies impulsivity (Enticocot 2006). The report of dissociation between the relationship among three impulsivity facets and behavioural problems suggest a relative independence of the three impulsivity sub-traits. Sub-traits of impulsivity are differentially related to executive processes (Kam 2012). Taylor hypothesized that non-planning and attentional impulsivity measures in BIS may partly reflect executive functions disturbances (such as working memory, inhibitory control, task shifting) which are associated with anxiety (Taylor 2008).

Core features of anxiety disorders such as: behavioural inhibition, harm avoidance, safety-seeking, anxious apprehension (involves excessive worry about potential negative or catastrophic outcomes) may seem inconsistent with conventional "view" of impulsivity such as increased risk seeking, acting without forethought, decreased anticipation of the consequences of one's behaviour (Taylor 2008, Summerfeldt 2004). Some authors speculate that anxiety may serve as a protective factor against disinhibited, potentially dangerous activities that could lead to early mortality and there is also hypothesis that anxiety protects against impulsivity in bipolar disorder (Taylor 2008). Thus, impulsivity may not necessarily be a maladaptive trait and may be functional when in spite of acting without forethought the act is beneficial, while in dysfunctional impulsivity the act is a source of trouble or harm to self or others (Neto 2011). In properly working neural networks a motivations of act rashly based on arousal from the limbic system is inhibited by communication from the prefrontal cortex.

Dopamine and serotonin enable two-way communication between areas of the prefrontal cortex and amygdala. The individuals with experimentally induced lowering of 5-HT showed increased levels of impulsivity (Neto 2011). Studies confirm that impulsivity is related to lower 5-HT transmission (Dalley 2012). Some studies show that reduce 5-HT-ergic tone is related to

increased impulsivity. Impulsivity is multi-faceted phenomenon and its components may have a heterogenous relationship with the serotonergic multiplicity in the brain (Dalley 2012). Impulsive responding in a novel anxiety-eliciting environment may present as behavioural disinhibition, which can be recorded as an anxiolytic-like effect (Harro 2002). It is well known that 5-HT system contribute to "waiting to avoid punishment". According to the same authors 5-HT system plays also role in "waiting to obtain reward" with the purpose to achieve delayed reward (Miyazaki 2012). Distinct neural and neurochemical systems underlie different aspects of impulsive behaviour what was confirmed by the mixed effects of 5-HT receptor ligands on different tests of impulsivity (Dalley 2002). It was hoped that identification of relevant receptors and function of neurotransmitters would give the answer for the nature of anxiety and lead to better design treatments. However, medication does not necessarily cure anxiety disorders often reducing the symptoms (Nutt 2005).

The purpose of this article is to provide an overview of impulsivity in anxiety disorders, look through research in that field. A major limit of most studies is only a psychometric impulsivity measure.

RESULTS

Some studies found no correlation between anxiety and impulsivity (Apter 1993, Lecrubier 1995, Caci 1998, Askenazy 2000). According to Perugi et al. (2011) the state and trait of impulsivity are higher in patients with anxiety disorders than in healthy control. High levels of impulsivity in patients with anxiety disorders comparing to healthy controls were also observed by other authors (del Carlo 1998, Kashdan 2008, Kashdan 2009). Also patients with panic disorder, social anxiety disorder, obsessive-compulsive disorders reported higher scores than healthy controls in total impulsiveness and cognitive dimension comparing to healthy controls (Summerfeldt 2004). Furthermore, OCD patients with tics were found to be associated with elevated levels of impulsivity comparing to OCD patients without tics only in cognitive dimension what was related to increased severity of obsessions in the tic group (Summerfeldt 2004). Patients suffering from bipolar disorder and comorbid anxiety disorders comparing to healthy controls also seem to present higher levels of impulsivity (Taylor 2008, Preve 2014). Moreover anxiety disorder and bipolar disorder comorbidity is associated with negative outcome of bipolar disorder: increasing bipolar severity, reduced duration of euthymia periods, grater functional impairment, diminished quality of life (Taylor 2008). It has been estimated that up to 52% of patients with bipolar disorder have cooccurring anxiety disorder at some point of their lives (Preve 2014). The cooccurrence of bipolar disorder with anxiety, impulsivity, substance use disorders is well established

(del Carlo 2013). It was also proven in numerous studies, that patients with bipolar disorder and anxiety disorder present higher levels of impulsivity in comparison to bipolar patients without such comorbidity (del Carlo 2013). There is a need to project neurobiology researches to elucidate a specific endophenotype among bipolar disorder patients "that are more impulsive to reduce anxiety symptoms" (Preve 2014). According to Swan three sub-traits of impulsiveness are differentially related to the affective states in bipolar disorder: motor impulsiveness is related to manic episodes, non-planning impulsiveness to depressive phases and attentional one to both manic and depressive episodes (Swan 2008) being the most unstable factor (Vasconcelos 2012). Patton proposed that cognitive impulsivity aspects is a general process underlies personality trait of impulsiveness as a whole. In spite of the fact that in anxiety disorders harm avoidance and behavioural inhibition (tendency to react to novelty with restraint, reticence, avoidance or distress) (Taylor 2008) are present, anxious patients occurred more impulsive than healthy subjects (del Carlo 2013, Summerfeldt 2004) in both psychometric and neurocognitive measures. Anxiety disorder patient scored higher in total but also attentional and non-planning subscales (del Carlo 2013).

It seems patients with anxiety disorder may engage in impulsive behaviour when they experience negative internal experiences e.g.: negative affect, uncertainty. What more probably this is the impulsivity function to regulate or manage negative affect and uncertainty (Pawluk 2013). A substantial number of studies have reported a higher incidence of suicidal ideation and suicide attempts in subjects with panic disorder (del Carlo 2013, Schmidt 2001, Woodruff-Borden 1997). The risk of suicide in panic disorder patients is partly due to secondary depression. However it is speculated there are anxiety-specific factors (severity of anxiety, anticipatory anxiety, attentional hypervigilance, avoidance of bodily sensations, fear of insanity) which may interact with the condition of panic disorder to increase risk for subsequent depression and suicidal ideation (Schmidt 2001).

CONCLUSION

Literature indicate that anxiety symptoms comorbidity is common in patients with other mental disorders. Epidemiological studies in the general population show that anxiety disorders have a lifetime prevalence of approximately 21% and a notable number of patients with anxiety disorders do not respond fully to treatments (Nutt 2005). Anxiety and impulsivity are two main risk factors of suicidality (Piero 2010). Impulsivity plays a prominent role in numerous psychopathological states, it is not unitary phenomenon and influences pathogenesis, course, clinical severity of many mental disorders (Swann 2003, Piero 2010). According to some authors impulsiveness may be a result of an interaction among a

few multiple components. There is a lack of consensus of impulsivity operational definition what leads to variance in the assessment (Piero 2010).

It has been traditionally stated that impulsivity displays a negative relationship with anxiety. It was based on the assumption that anxiety alters the individual to potential danger and operates to inhibit behaviour under conditions of heightened threat (Preve 2014). In reality, the data revealed high rates of comorbidity between anxiety disorders and impulse control disorders (Preve 2014). Such results stay in contrast to theoretical description of anxiety highlighting core features such as harm avoidance and behavioural inhibition (Taylor 2008). Future research is needed to diagnosed impulsivity level in anxiety disorders and the impact of impulsivity on anxiety disorders outcomes (Piero 2010). Patients with differential groups of anxiety disorders need specific approaches to the treatment and taking into account impulsiveness dimensions which would lead to better therapeutic response, reduce the risk of dropout, self-harm, suicidality. Further research in that field are necessary to help in the choice of the best treatment. Higher impulsiveness may decrease response to treatments even without a comorbidity with personality disorder in Axis II (Piero 2010). It should be established whether reduction in impulsivity might result in reduction of anxiety or conversely whether reduction in anxiety may result in reduction of impulsivity (Taylor 2008). Better understanding of these relations would provide better interventions for patients.

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References

1. Apter A, Plutchik R, van Praag HM: *Anxiety, impulsivity and depressed mood in relation to suicidal and violent behavior. Acta Psychiatr Scand* 1993; 87:1-5.
2. Askenazy F, Caci H, Myguel M, Darcourt G, Lecrubier Y: *Relationship between impulsivity and platelet serotonin content in adolescents. Psychiatry Res* 2000; 94:19-28.
3. Baldwin DS, Anderson IM, Nutt DJ, Allgulander C, Bandelow B, den Boer JA, Christmas DM, Davies S, Fineberg N, Lidbetter N, Malizia A, McCrone P, Nabarro D, O'Neill C, Scott J, van der Wee N and Wittchen HU: *Evidence-based pharmacological treatment of anxiety disorders, post-traumatic stress disorder and obsessive-compulsive disorder: A revision of the 2005 guidelines from the British Association for Psychopharmacology. J Psychopharmacology* 2014; 28:403–39.
4. Barrat Impulsiveness Scale: *An update and review. Pers Individ Dif* 2009; 47:385-95.
5. Bellani M, Hatch JP, Nicoletti MA, Ertola AE, Zunta-Soares G, Swann AC, Brambilla P, Soares JC: *Doses anxiety increase impulsivity in patients with bipolar disorder or major depressive disorder? J Psychiatr Res* 2012; 46:616-21.

6. Caci H, Askenazy F, Frequelin N, Nadalet L, Myquel M, Staccini P, Boyer P: Validation of the Impulsivity Rating Scale and relationship with anxiety in healthy French adolescents. *J Affect Disord* 1998; 30:357-68.
7. Dalley J, Theobald DE, Eagle DM, Passetti F, Robbins TW: Deficits in impulse control associated with tonically-elevated serotoninergic function in rat prefrontal cortex. *Neuropsychopharmacology* 2002; 26:716-28.
8. Dalley JW, Roiser JP. Dopamine, serotonin and impulsivity. *Neuroscience* 2012; 215: 42-58.
9. Del Carlo A, Benvenuti M, Fornaro M, Toni C, Rizzato S, Swann AC, Dell'Osso L, Perugi G. Different measures of impulsivity in patients with anxiety disorders: a case control study. *Psychiatry Res* 2012; 30:197: 231-6.
10. Del Carlo A, Benvenuti M, Toni C, Dell'Osso L, Perugi G: Impulsivity in patients with panic disorder-agoraphobia: the role of cyclothymia. *Compr Psychiatry* 2013; 54:1090-7.
11. Enticott PG, Ogloff JRP, Bradshaw JL: Associations between laboratory measures of executive inhibitory control and self-reported impulsivity. *Pers Individ Dif* 2006, 41:285–94.
12. Eysenck SBG, Pearson PR, Easting G, Allsopp JF. Age norms for impulsiveness, venturesomeness and empathy in adults. *Pers Individ Dif* 1985; 6, 613–19.
13. Hamilton KR, Mitchell MR, Wing VC, Balodis IM, Bickel WK, Fillmore M, Lane SD, Lejuez CW, Littfield AK, Lijjten M, Mathias SH, Mitchell SH, Napier TC, Reynolds B, Schutz CG, Setlow B, Sher KJ, Swann AC, Tedford SE, White MJ, Winstanlay CA, Yi R, Potenza MN, Moeller FG: Choice impulsivity: definitions, measurement issues, and clinical implications. *Personal Disord* 2015; 6:182-98.
14. Harro J: Long-term partial 5-HT depletion: interference of anxiety and impulsivity. *Psychopharmacology* 2002; 164:433-34.
15. Kam JWY, Dominelli R, Carlson SR: Differential relationship between sub-traits of BIS-11 impulsivity and executive processes: An ERP study. *Int J Psychophysiol* 2012; 85:174-87.
16. Kashdan TB, Hofmann SG: The high-novelty-seeking, impulsive subtype of generalized social anxiety disorder. *Depress Anxiety* 2008; 25:535-41.
17. Kashdan TB, McKnight PE, Richey JA, Hofmann SG: When social anxiety disorder co-exist with risk-prone, approach behavior: investigating a neglected, meaningful subset of people in the National Comorbidity Survey-Replication. *Behav Res Ther* 2009; 47:559-68.
18. Lecrubier Y, Braconnier A, Said S, Payan C: The impulsivity rating scale (IRS): preliminary results. *Eur Psychiatry* 1995; 10:331-38.
19. Miyazaki K, Miyazaki KW, Doya K: The role of serotonin in the regulation of patience and impulsivity. *Mol Neurobiol* 2012; 45:213-24.
20. Moeller FG, Barrat ES, Doughert DM, Schmitz JM, Swann AC: Psychiatric aspects of impulsivity. *Am J Psychiatry* 2001; 158:1783-93.
21. Neto RCA, True M: The development and treatment impulsivity. *Psico* 2011; 42:134-41.
22. Newman AL, Meyer T: Impulsivity: present during euthymia in bipolar disorder?-a systematic review. *Int J Bipolar Disord* 2014; 2:2.
23. Nutt D, Ballenger J *Anxiety Disord: Wiley-Blackwell*, 2005.
24. Patton JH, Stanford MS, Barrat ES: Factor structure of the Barrat Impulsiveness Scale. *J Clin Psychol* 1995; 51:768-774.
25. Pawluk EJ, Koerner NA: Preliminary investigation of impulsivity in generalized anxiety disorder. *Pers Individ Dif* 2013; 54:732-37.
26. Perugi G, Del Carlo A, Benvenuti M, Fornaro M, Toni C, Akiskal K, Dell'Osso L, Akiskal H: Impulsivity in anxiety disorders patients: Is it related to comorbid cyclothymia? *J Affect Disord* 2011; 133:600-06.
27. Piero A: Personality correlates of impulsivity in subjects with generalized anxiety disorders. *Comprehen Psych* 2010; 51:538-45.
28. Preve M, Mula M, Maltini E, Pini S: Panic-agoraphobic spectrum symptoms are associated with impulsivity in bipolar disorder. *Ann Depress Anxiety* 2014; 1:1016.
29. Reynolds B, Ortengen A, Richards JB, de Witt H: Dimensions of impulsive behavior: Personality and behavioral measures. *Pers Individ Dif* 2006; 40:305–15.
30. Rodrigues Poubel Alves M, Martinho Pereira V, Machado S, Egidio Nardi A, Cardoso de Oliveira e Silva A: Cognitive functions in patients with panic disorder: a literature review. *Rev Bras Psiquiatr* 2013; 35:193-200.
31. Saddichha S, Schuetz C: Impulsivity in remitted depression: A meta-analytical review. *Asian J Psychiatry* 2014; 9:13-16.
32. Schmidt NB, Wollaway-Bickel K, Bates M: Evaluating panic-specific factors in the relationship between suicide and panic disorder. *Behav Res Ther* 2001; 39:635-49.
33. Stanford MS, Mathias CW, Doughert DM, Lake SL, Anderson NE, Patton JH: Fifty years of the Barrat Impulsiveness Scale: An update and review. *Pers Individ Dif* 2009; 47:385-95.
34. Summerfeldt L, Hood K, Antony MM, Richter MA, Swinson RP: Impulsivity in obsessive-compulsive disorder: comparisons with other anxiety disorders and within tic-related subgroups. *Pers Individ Dif* 2004; 36:539-53.
35. Swann A, Bjork JM, Moeller FG, Dougherty DM: Two models of impulsivity: relationship to personality traits and psychopathology. *Biol Psychiatry* 2002; 51:988-94.
36. Swann A, Pazzaglia P, Nicholls A, Douherty DM, Moeller FG: Impulsivity and phase of illness in bipolar disorder. *J Affect Disord* 2003; 73:105-11.
37. Swann AC, Steinberg JL, Lijffijt M, Moeller FG: Impulsivity: differential relationship to depression and mania in bipolar disorder. *J Affect Disord* 2008; 106:241-48.
38. Taylor CT, Hirshfeldt-Becker DR, Ostacher MJ, Chow CW, LeBeau RT, Pollack MH, Nierenberg AA, Simon NM: Anxiety is associated with impulsivity in bipolar disorder. *J Anxiety Disord* 2008; 22:868-76.
39. Vasconcelos AG, Malloy-Diniz L, Correa H: Systematic review of psychometric proprieties of Barrat Impulsiveness Scale Version 11 (BIS-11). *Clin Neuropsychiatry* 2012; 9:61-74.
40. Woodruff-Borden J, Stanley MA, Lister SC, Tabacchi MR: Nonclinical panic and suicidality: prevalence and psychopathology. *Behav Res Ther* 1997; 35:109-16.

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