An examination of hypomanic personality traits, impulsivity and risk in a non-clinical sample

‘A blessing and a curse’

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ABSTRACT

This investigation explores the effects of impulsivity, risk-taking and perceived-risk attitude on hypomanic personality traits (HPTs), using an international non-clinical snowball sample (N = 202).

HPTs can be categorised as mental health problems within bipolar disorders (BP) or as normal personality traits. Both exhibit marked changes in mood and reveal symptomatic similarities between impulse control disorders and BP. Consequently, engagement in impulsive acts and pleasure-seeking risky activities is characteristic. An online battery of well-established self-report measures were administered; Hypomanic Personality Scale, Barratt Impulsivity Scale and Domain-Specific-Risk-Taking-Scale (Risk-taking and Risk-Perception).

Pearson's r correlations and multiple regression analyses were conducted. Findings illustrated that mean scores on all measures were higher than the non-clinical average. There was a significant positive correlation between HPS and BIS-total, Attentional-Impulsivity, Motor-Impulsivity, and RT-total. This produced a significant positive model in multiple regression analysis. Given the findings, a t-test was conducted which demonstrated significantly higher mean scores for HPS-high scorers over the remaining sample on BIS, RT and significantly lower RP.

It can be concluded that HPS score is significantly affected by BIS and RT. Whereas RP negatively predicted HPS-scores at an insignificant level ($F = .955$ (1, 200) $p > .05$). Significant demographic differences also occurred.

KEY WORDS:	**HYPOMANIA**	**IMPULSIVITY**	**RISK**	**PERSONALITY**	**BIPOLAR**

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Introduction

Traditionally there have been efforts to ascertain the role of personality types and features within affective disorders. However validity surrounding the construct of hypomanic personality is weak, particularly so regarding associated predictors. Nonetheless, impulsivity and risk have long been interrelated HPTs, therefore this investigation integrates such lines of enquiry using a non-clinical sample.

Hypomania

Psychological literature refers to traits aspects of hypomania as; 'hypomanic-personality traits' (HPTs) (Meyer, 2002), 'hypomanic-proneness' (Kwapil *et al*., 2000) and 'hypomanic-tendencies' (Meads & Bentall, 2008). Whereas within neurobiological research, hypomania is referred to as; 'mild-mania' or 'highs', which are characterised by attenuated manic-symptoms (O'Sullivan *et al*., 2011). Agosti & Stewart (2008) maintain such descriptions are misleading, as symptoms can be unpleasant and disturbing. Judd & Akiskal (2003) found that 6.4% of the population experience 'soft-bipolar symptoms' which provides support for BP as a spectrum-disorder. Prospective studies have shown hypomanic-symptoms in adolescence are predictive of future BP (Angst *et al*., 2005).

As a mood state, hypomania has been characterised as behavioural and phenomenological manifestations of persistent mood elevation (euphoric hypomania), with few mixed-mood affects. This creates feelings of grandiosity, disinhibition, risk-taking (RT), fearlessness and temperament fluctuations (Meyer *et al*., 2002; Putman *et al*., 2007). However, recent literature has challenged such notions (Smith *et al*., 2006), affirming that dysphoric or mixed manifestations are just as frequent, but remain unreported. French *et al.* (1996) argued that those experiencing dysphoric symptoms are defensive and guarded; therefore individuals become irritable, controlling and argumentative (Goodwin, 2002). Meads & Bentall (2008) established that impulsive, rude and narcissistic tendencies are also characteristic. Such over-activity can initiate destructive personality features (e.g., hypersexuality), addiction-prone tendencies and poor decision-making (e.g., drink-driving), leading to impaired judgement (Smith & Ghaemi, 2006).

It is widely accepted that the distinction between mania and hypomania is "the presence of psychosis and the consequential social and occupational impairment experienced in mania" (Richardson, 2009, p.26). This is greatly debated as research demonstrated that hypomania is more than a milder form of mania. Factor analysis illustrated distinctions between symptom and cluster prevalence in HPTs and mania (e.g., Benazzi & Akiskal, 2003), similarly Akiskal & Benazzi (2005) reported insignificant differences in severity and co-occurrence of dysphoric symptoms in hypomania and mania. This suggests dysphoric symptoms could be a fundamental factor, as it is uncommon to experience pure euphoric symptoms (Cassidy & Caroll, 2001). Research investigating rumination surprisingly found negative-rumination was present in hypomania, thus proposing that those focussing on negative self-qualities possess HPTs (Ghaznavi & Deckerbach, 2012). Scott & Pope (2003) similarly reported greater negative and positive self-esteem in hypomania than depression. Gartner (2005) contended that for those with HPTs and/or clinical-hypomania there is no suffering, as it should be regarded as a dystonic personality temperament, rather

than a syntonic pathology. Yet Hirschfeld (1999), interestingly referred to 'hypomanic personality' as a myth.

Meads & Bentall (2008) concluded that hypomania should be classified as a dimensional trait-or-style of personality, encompassing individual differences and normal life experiences. This is consistent with previous personality-research (e.g., Akiskal *et al*., 1992). Kwapil *et al*. (2000) defended hypomania as a mood disorder, agreeing individuals are highly-susceptible to addictions, due to increased pleasure-seeking propensities (Krumm-Merabet *et al*., 2005; Mason *et al.,* 2012), impulse control disorders (Maremmani *et al*., 2004), mania and BP-II (Swann *et al*., 2007). Additionally, neuroimaging provides further support for hypersensitivity to reward in those vulnerable to hypomania and mania (O'Sullivan *et al*., 2011). Although, Bauer (2005) claimed that mood cannot be a central component or characteristic, as there are considerable symptoms and feature variations.

Controversy occurs when differentiating 'normal-temperament' and 'mood-disorder', as distinctions are often unclear. This may be attributed to the categorical 'checklist' approach used in diagnosis. The DSM-IV-TR (APA, 2000) refers to a 'hypomanic episode' as a mental illness, categorised by persistently elevated-or-irritable moods, lasting at least four days (including ≥ 3 DSM-criteria; Appendix-1), without social or occupational dysfunction, with multiple episodes warranting BP-II diagnosis. The International Classification of Diseases (ICD-10) lowers DSM distinctions, by characterising hypomania as simply a milder/lesser form of mania (Goodwin, 2002), lasting several days and resulting in significant work or social intrusion (ICD-criteria; Appendix-2). Therefore, individuals with ICD defined hypomania could easily fit DSM-criteria for mania; ultimately giving rise to misperceptions and diagnosis uncertainty.

Impulsivity

Impulsivity is physiologically and clinically related to various conditions (e.g., BP, hypomania, ADHD and anti-social personality disorder; Swann *et al*., 2001; Henry *et al.,* 2001; Dougherty, 2000) despite not being a clinical condition. Vasconcelos *et al.* (2012) stated that impulsivity is "an essential dimension of personality and is related to distinct personality traits and neuropsychological functions" (p.61). Neurophysiology research indicates numerous brain regions, particularly the amygdala, prefrontal and orbitofrontal cortex (Winstanley *et al*., 2006; Brunch, 2009) are linked to risky decision-making, poor self-regulation and low impulse control (Murtagh & Todd, 2004). HPTs and impulsivity correlate with Eysenck's biosocial model, which could explain some criminal and impulsive decisions (Cale, 2006). Zuckerman (1989) argued 'impulsive unsocialised sensation-seeking' describes psychotism. This corresponds with Durbin *et al*.'s (2009) association of HPTs and normal-abnormal dimensions of personality.

Research within clinical populations highlighted comorbidity and symptomatic similarities between impulse control disorders and BP (Mansell *et al.,* 2008). Richard & Garavan (2010) stated that both can be characterised by RT and impulsive behaviours, such as gambling, dubious financial decisions and promiscuous sexual activity (Mason *et al*., 2012). Mania-related personality traits such as sensation-seeking, have been found to be inherently linked to mood-elevating impulsive decision-making (Meyer *et al*., 2007). Within BP, impulsivity is largely regarded as a broad construct incorporating numerous facets of cognition and behaviour (Johnson

et al., 2012). However, Whiteside & Lynam (2001) state that there is limited support suggesting strong intercorrelations.

Research for both aspects of impulsivity; state-impulsivity within manic states, and trait-impulsivity extending across mood-states, is well-established (Peluso *et al.,* 2007). This upholds notions of state and trait impulsivity as integral aspects of BP and remission (Lewis *et al.*, 2009). Benazzi (2007) examined the connection between irritability and overactivity, and documented trait-impulsivity in 41.1% of individuals diagnosed with BP-II. Contrastingly, Swann *et al.* (2003) found that during hypomanic or manic episodes, behavioural measures are elevated, regardless of illness phase. This proposes a linear formation between impulsivity and manic symptoms in BP-I and II (Swann *et al.,* 2007). High-scores on the HPS correlated with high-scores on the impulse-nonconformity-scale (Kwapil *et al.,* 2000) which further sustained the link.

Risk-Taking

Excessive risk-taking during hypomania has been widely recognised (Fletcher *et al.,* 2013a). Leigh's (1999) well-established definition expresses RT as engagement in behaviours that simultaneously involve potential for reward and punishment. Ryb *et al.* (2006) suggested that 'risk-taking dispositions' manifest in individuals with high-impulsivity and low risk-perception (RP). This is particularly so for behaviours causing harm to self and others (Michalak *et al.,* 2006). However within BP and mania, RT can be extremely dangerous across the lifespan. Lynn (2001) argued that a diagnosis debate arises between BP, ADHD and hypomania, as excessive RT can overwhelm ones personality, leading to misdiagnosis.

BP, impulsivity and risky-behaviour have been implicitly treated as unidimensional constructs. Excessive participation in pleasure-seeking and precarious activities have been affirmed in individuals displaying HPTs (Swann *et al.,* 2003), heightened risk for BP (Krumm-Merabet & Meyer, 2005) and severe manic-episodes in later life (Kwapil *et al.,* 2005). The association between domain-specific-risk-taking and the emergence of HPTs have long been established (Hanoch, Johnson & Wilke, 2006); instrumental-risks involve financial decisions, whereas stimulating-risks involve social, recreational, ethical and health/safety decisions (Blais & Weber, 2006; Hanoch *et al*., 2006). Stimulating-risks have been associated with arousal levels and thrill-seeking (Zaleskiewicz, 2001). Power (2005) stated that there is little explanation as to what impulsivity and RT comprise of, including poor justification of the mechanisms and processes involved in RP processes.

MacDonald & Martineau (2002) concluded that unpleasant moods experienced in hypomania can promote RT and precarious decision-making. However, Blanchette & Richards (2010) found that the relationship between 'mood' and 'risk' is extremely complex, as physiological changes and hypersensitivity to reward occurs. Poor emotion-regulation has been associated with increased participation in high-risk activities, such as alcohol-induced antisocial behaviour (Magar *et al*., 2008). Feedback-Related-Negativity data is greatly reduced in impulsive and risky individuals, which may be due to dampened error processing, leading to impulsive and precarious behaviours (Mason *et al*., 2012). Webb *et al*. (2012) reported an amplified willingness to engage in risky-activities when arousal levels were increased

and unpleasant moods induced. Such deficits in decision-making and risky choice, could suggest low RP.

Risk-Perception

Increased impulsivity and risky-behaviours have been associated with varied RP's within BP, hypomania and as normal personality traits (Ryb *et al*., 2006). Blais & Weber (2006) defined perceived-risk attitude as "the willingness to engage in risky-activities and behaviours as a function of the perceived-riskiness" (p.35). However Casey *et al*. (2008) stated that perceived-riskiness fluctuates depending on the individual and context, thus conceptualising risk as a social construct. Reckless individuals such as those who drink-drive, have shown greater risk for future BP-diagnosis. Whereas, individuals who participate in sky-diving classes, have presented normal personality traits, as RP differs due to expected outcome and benefits (Field & O'Keefe, 2004).

Behavioural neuroscience has demonstrated that male adolescent populations are the greatest risk-takers, indicating the greatest neuronal activity (Weber *et al*., 2002). However, many have contended that the science of risk-attitude can be conceptualised using psychological risk-return and behavioural decision-making frameworks (Reyna & Rivers, 2008). Hanoch *et al.* (2006) argued that RP can involve extreme over-and-under estimations, which is specifically dependent on individual personality characteristics. Such concepts are widely debated within domain-specific-risk-taking frameworks.

Aims(A)/Hypotheses(H)

(A1) to explore the effects of BIS (Patton *et al.,* 1995) and DOSPERT- RT and RP (Blais & Weber, 2006) subscale and total-scores on the HPS (Eckblad & Chapman, 1986). (A2) to investigate the interaction of demographic variables on: HPS, BIS and DOSPERT subscale and total-scores. Consistent with previous literature, it is hypothesised: (H1) HPS-scores will positively correlate with BIS and RT total scores. (H2) there will be significant total-score differences on HPS, BIS, and DOSPERT across demographic variables. (H3) HPS high-scorers will score significantly different on BIS and DOSPERT when compared to the remaining sample.

Method

Design

An online-survey based design was implemented. The dependent variable (DV) was HPS, which graded participants as high, medium or low risk of HPT and mania. There were three independent variables (IV's); BIS (nine-subscales), RTS and RPS (five-subscales). All participants completed the same battery of three well-established questionnaires; therefore a within-subjects design was integrated.

Materials

The online survey created for this investigation provided participants with an information page, briefly explaining the 'Measure of specific Behaviour Traits' and informed participants of anonymity, right-to-withdraw, and ability to contact the researcher via the email address provided. Participants were requested to provide: Age, Gender, Present Occupation-Education and Nationality (Appendix-3), before

completing the three questionnaires. The psychometric scales used assessed HPTs, impulsivity, risk-taking behaviour and perceived-risk.

Hypomanic Personality Scale (HPS; Appendix-4)
The HPS is a widely used uni-dimensional measure, which identifies individuals predisposed to hypomanic episodes and BP. The original English version was used, which consists of 48 true-false items assessing periodic shifts in emotion and behaviour. Scores range from 0-48 and are scored using deciles; upper-decial (high-HPTs; ≥31) act as a predictor of BP symptoms and hypomanic episodes short-term (Eckblad & Chapman, 1986) and detects a greater-risk of clinical mania and BP long-term (10-13 year follow up; Kwapil *et al*., 2000).

Initial validation studies demonstrated 78% of high-scorers met criteria for mood disorders (SADS-L; Spitzer & Endicott, 1977), compared to 0% of low-scorers/control group. The HPS has revealed associations between reward hypersensitivity, creativity, psychosocial-risk, and cognitive facets of mania and BP (e.g., Eisner *et al.,* 2008; Durbin *et al.,* 2009). Eckblad & Chapman (1986) reported good internal consistency (α = .87) and 15-week test-retest reliability (r_{tt} = .81). Good internal consistency was obtained for this investigation (α = .72).

Barratt Impulsiveness Scale (BIS-11;Appendix-5)
The BIS-11 is a universally used multidimensional measure, which assesses the multifaceted personality/behavioural construct of impulsivity. It consists of 30 four-point Likert scale items, from 1 “rarely/never” to 4 “almost always/always”. Scores range from 30-120 using six 1st-order facets, constituting three 2nd order facets: Attentional-Impulsiveness (8-items; 3-reversed), Motor-Impulsiveness (11-items; 1-reversed) and Non-Planning-Impulsiveness (11-items; 8-reversed). Reversed items describe non-impulsive behaviours. Total scores of 52-68, are considered normal (Swann *et al*., 2002), therefore ≥74 indicates extreme rates of impulsivity (Patton *et al*., 1995). High-scores also represent stable characteristics within BP and mania (Peluso *et al.,* 2007).

Further research identified differential relationships between 2nd order facets and BP episodes: Attentional-Impulsivity with manic and depressive; Motor-Impulsivity with hypomanic and manic; and Non-Planning-Impulsivity with depressive (Swann *et al.,* 2008). Associations between a range of psychological disorders and impulsivity have also been found (Vasconelos *et al.,* 2012). BIS reported good internal consistency (α = .83), and Stanford *et al*. (2009) found good test-retest reliability (r_{tt} = .83). High internal consistency was obtained for this investigation (α = .84).

Domain-Specific-Risk-Taking-Scale (Blais & Weber, 2006; Appendix 6)
The revised DOSPERT-R (2006) assesses both conventional risk-attitudes and perceived risk-attitudes in different domains (Weber *et al.,* 2002; Blais & Weber, 2006). Both aspects of risk, risk-taking and risk-perception, are referred to as (RT) and (RP) respectively. DOSPERT-R consists of 30 seven-point Likert scale items reported twice: RT, from 1 “extremely unlikely” to 7 “extremely likely”; RP, from 1 “not at all risky” to 7 “extremely risky”. The 30 items are decomposed into five subscales: ethical, financial, health/safety, social and recreational. Subsequently scores range from 30-210, which indicates the degree of RT and RP. Thus, scores symbolise high or low RT and/or RP.

Finucane *et al*. (2000) suggested that increased RP is associated with less RT. DOSPERT has demonstrated the complexity of dispositional and contextual factors within risk (e.g., Deck *et al*., 2010). Hanoch *et al.* (2006) found scores can be predicted in certain individuals: student alcohol users often score high for Health/Safety and Recreational RT, whereas sporting individuals score high for Recreational, but low for Health/Safety RT (Holt & Laury, 2002; Weller & Tikir, 2010). Adequate mean internal consistency for RT and RP has been reported (RT; α = .78, RP; α = .77), and test-retest reliability (r_{tt} = .44-.86). Good internal consistency was obtained for this investigation (RT; α = .90; RP; α = .92).

Participants

In an attempt to obtain a heterogeneous sample, participants were recruited using snowball-sampling. Descriptive emails containing the survey's URL were sent to British and American universities, along with social media networks (Appendix-7). Ethical approval was obtained from Manchester Metropolitan University and Toronto University (Appendix-8). From this, *N* = 336 completed the survey, however, 134 were excluded due to missing data. From the 202 fully-completed responses, mean age was *M* = 22.11 years (*SD* = 7.71; range = 16-59 years), with a gender distribution of 67% (*N* = 136) female and 33% (*N* = 66) male. The sample consisted of a range of nationalities: South/West European 74% (*N* = 149), North/West American 12% (*N* = 25), South/West Asian 7% (*N* = 13), dual-nationality 5% (*N* = 10), North/South African 2% (*N* = 5). Participants were also asked current education/occupation: Education 87% (*N* = 180), Occupation 10% (*N* = 17) and Unemployed 3% (*N* = 5). All participants remained anonymous.

Procedure

May to July 2012 was spent deciding which psychometric tools and survey-creator should be used. During this time, necessary Ethical Approval was gained; therefore the online survey could be constructed and data collection could begin. A preliminary pilot study was conducted in August 2012, using *N* = 11 participants: Education (*N* = 6) and Occupation (*N* = 5). This helped ascertain potential survey problems. *N* = 6 reported that DOSPERT RT and RP could be combined to reduce monotony and completion time. Such modifications were made, which become the final combined phase of this investigation (Appendix-9).

September 2012 to January 2013 was spent recruiting participants through email requests to various colleges and universities: Manchester Metropolitan University (MMU), Toronto University, University of Miami, Dalhousie University, Brandon University, Drexel University, Loreto College, Oldham College and networking sites. MMU, Toronto University and Loreto College agreed to pass on the URL.

Once participants had accessed the URL, they were taken to the online survey where a cover sheet with integrated consent form, psychometric scales and debriefing form were presented. Only fully-completed responses were eligible for initial Excel formatting and subscale formation. The data was finally inputted into SPSS-19 (IBM Corp, 2010) ready for analysis and manipulation.

All statistical analyses were completed using SPSS-19.0 (IBM Corp, 2010). Firstly, descriptive statistics were formulated for HPS, BIS, RT, and RP. From this, the data was examined for normality by means of graphical and statistical representations.

Reliability analyses with cronbach's α were conducted, which measured the internal consistency between each item. The obtained α was also compared to official α values for each scale and subscale. To examine the effects of demographic variables mean-scores were compared using an Independent *t*-test on gender, and one-way ANOVAs on Age, Nationality and Education/Occupation. To determine variable relationships and factorability, correlation analyses were conducted, which measured Pearson's (*r*) correlation coefficients. Finally, multiple regression analyses (*R*) were formulated, to explore the predictive capacity of the HPS (DV) on the BIS, RPS and RTS (IVs).

This investigation was completed in accordance with the British Psychological Society's Code of Ethics and Conduct guidelines (2009), and departmental Ethics Forms (AEAF & EFC), thus ensuring and maintaining participant well-being. However, this investigation has several methodological limitations which must be addressed so results may cautiously be presented. Firstly, due to survey length (total 138 questions) and completion time, participants could become distracted as it was noted that some questions were occasionally misinterpreted, as participants felt it "did not apply" to them. Furthermore, as a result of time constraints and survey length, the third aspect of the DOSPERT, 'expected benefits' of RT and RP could not be administered.

Results

Questionnaire data was entered into SPSS-19.0 (IBM Corp, 2010). Tests of normality and homogeneity were conducted. To visually analyse the normality of the data, graphical representations were drawn; all histograms revealed skewness (Appendix-10). Due to the skewness magnitude, Kolmogorov-Smirnov, Kurtosis and Skewness statistical tests were performed, which resulted in insignificant results at >+/-0.2 (Miles & Shelvin, 2001). The method used for calculating the standard error means that significance is limiting and unreliable in larger-sample sizes. Therefore as parametric tests are robust and restrictive, slight normality deviation can be tolerated (Howell, 2013, p.659).

Upon visual-inspection, normality could be approximated and multiple regression (*R*) conducted. Intended residual normality checks of the multiple *R* were performed, ensuring that approximation assumptions were correct. Thus individual plots did not require screening (Tabachnick & Fidell, 2013, p.82).

Descriptive Statistics

Descriptive statistics were calculated for HPS, BIS and DOSPERT. Results are reported to two decimal places.

Table 1

Descriptive statistics for HPTs, impulsivity, RT and RP

N = 202 : Scale	*M*	*SD*
HPS total	23.69	5.952
BIS total	68.59	12.29
BIS 1st order: Attentional	11.64	2.52
BIS 1st order: Cognitive Instability	6.90	2.25

BIS 1st order: Motor	16.71	4.37
BIS 1st order: Perseverance	7.58	2.16
BIS 1st order: Self-Control	13.72	3.75
BIS 1st order: Cognitive Complexity	12.03	2.82
BIS 2nd order: Non-Planning	25.76	5.69
BIS 2nd order: Attentional	18.54	3.96
BIS 2nd order: Motor	24.30	5.56
RTS total	103.2	29.58
RTS: Ethical	14.86	6.74
RTS: Financial	15.51	7.61
RTS: Health/Safety	20.04	8.04
RTS: Recreational	22.78	10.21
RTS: Social	30.02	6.67
RPS total	137.5	28.83
RPS: Ethical	29.88	6.80
RPS: Financial	29.57	7.12
RPS: Health/Safety	31.11	7.23
RPS: Recreational	27.69	7.56
RPS: Social	19.24	6.39

The mean scores for HPS, BIS and DOSPERT are comparable to studies using similar populations and ages (Meads & Bentall, 2008; Meyer, 2002). However, as this is a non-clinical sample, total-scores were higher than expected.

HPS mean score (*M* = 23.69) was higher than much recent literature (e.g., Durbin *et al.*, 2009). Using deciles suggested by Eckblad & Chapman (1986), 13.86% (*N* = 28) scored highly (≥31), suggesting the presence of HPTs. Similarly, the BIS-total (*M* = 68.59) was also higher than recent literature. Scoring one SD above mean (Patton *et al*., 1995), 31.69% (*N* = 64) obtained a score suggesting excessive impulsivity (≥74). The DOSPERT- RT (*M* = 103.2) and RP (*M* = 137.5) total is consistent in non-clinical samples. Weber & Blais (2006) report that the higher the score, the greater the indication of RT or RP.

HPS high-scorers were separated from the sample (*N* = 174), to ascertain whether there was a difference between mean totals and subscale scores. Figure 1 represents this comparison.

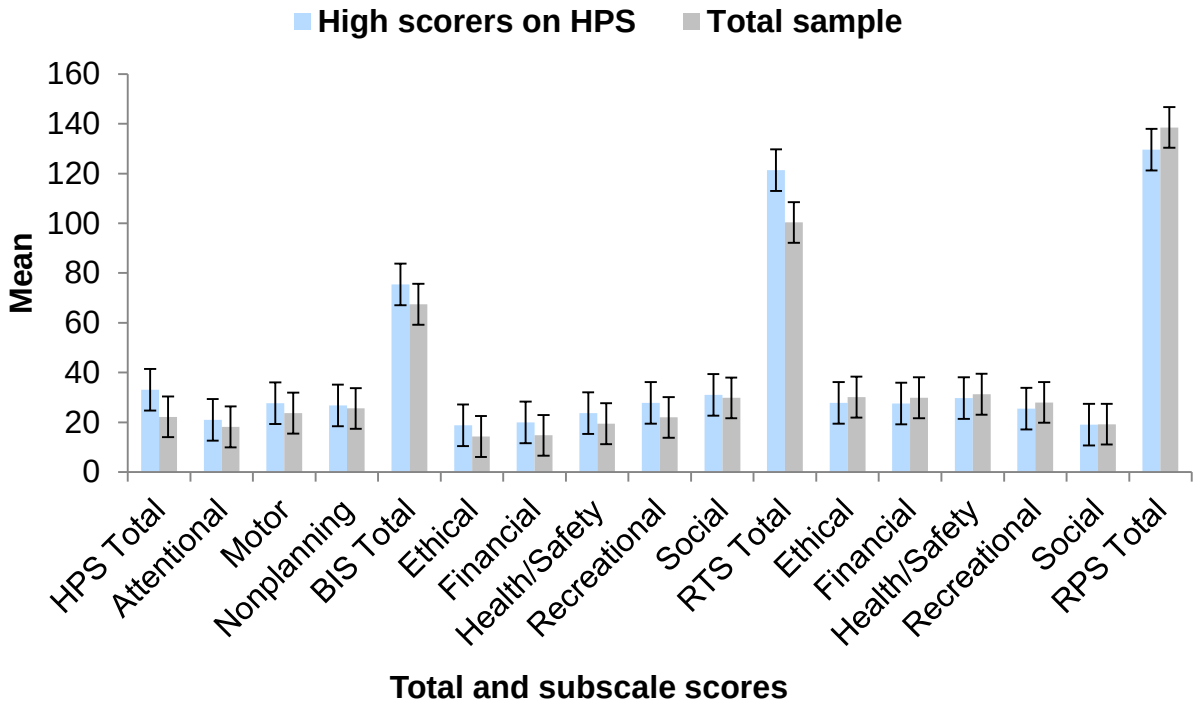

Figure 1: Mean scores comparison between HPS high scorers and total sample

Figure 1 illustrates that HPS high scorers had greater mean scores on all subscales for BIS and RT, and lower scores for RP. To examine whether these total differences were statistically significant, an independent-sample t-test was conducted (Appendix-12). This revealed that equal variances were not assumed, as significant differences were found for BIS t (31.26) = 2.45, $p < .05$, RT t (30.1) = 2.7, $p < .05$ and RP t (31.02) = -.1.2, $p < .05$. Thus indicating that on average, HPS high-scorers score significantly higher on BIS and RT, and significantly lower on RP.

Internal Consistency

Table 2 illustrates the obtained α value for subscale and total-scores, compared with official α value produced by original researchers.

Table 2
Internal Consistency

N = 202 : Scale	Obtained α	Official α
HPS total	.72	.87
BIS total	.84	.83
BIS 1st order: Attentional	.35	.72
BIS 1st order: Cognitive Instability	.76	.64
BIS 1st order: Motor	.76	.72
BIS 1st order: Perseverance	.42	.48
BIS 1st order: Self-Control	.35	.27
BIS 1st order: Cognitive Complexity	.65	.55
BIS 2nd order: Non-Planning	.60	.74
BIS 2nd order: Attentional	.74	.59

BIS 2nd order: Motor	.75	.72
RTS total	.90	.78
RTS: Ethical	.72	.75
RTS: Financial	.83	.83
RTS: Health/Safety	.69	.71
RTS: Recreational	.85	.86
RTS: Social	.67	.79
RPS total:	.92	.77
RPS: Ethical	.71	.74
RPS: Financial	.81	.83
RPS: Health/Safety	.78	.74
RPS: Recreational	.81	.79
RPS: Social	.72	.83

It is generally accepted that α ≥ .70 shows high internal consistency. However, the measures used here require introspection, thus α ≥ .60 are acceptable (Langdridge & Hagger-Johnson, 2009). HPS, BIS, RT and RP obtained high internal consistency. This corresponds with official α. BIS 2nd order Non-Planning, RT-Health/Safety and RT-Social demonstrate acceptable internal consistency. BIS 1st order are excluded, as they constitute 2nd order subscales.

Ranges and exploration of demographic differences

HPS: 11-38 (out of 48), BIS: 41-111 (out of 140), RT: 47-201 (out of 210) and RP: 37-192 (out of 210). The sample consisted of participants aged 16-59 (*M* = 22.11). Table 3 illustrates mean differences.

Table 3
Descriptive Statistics: Demographic variables

(*N* = 202)	HPS		BIS		RT		RP	
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
Male	23.52	(06.49)	69.47	(12.40)	112.11	(29.42)	132.53	(29.39)
Female	23.77	(05.69)	68.17	(12.26)	98.88	(28.77)	139.90	(28.35)
Age 16-21	24.49	(05.83)	68.77	(11.43)	105.50	(28.01)	136. 77	(28.06)
Age 22-27	21.96	(05.66)	69.70	(16.45)	102.39	(33.29)	137.17	(33.55)
Age 28-33	22.08	(06.51)	67.08	(18.16)	97.92	(43.80)	137.33	(33.33)
Age 34 and over	20.12	(05.41)	66.65	(08.72)	87.88	(22.96)	144.47	(27.30)
Education	23.81	(05.91)	68.89	(12.76)	103.81	(29.83)	136.98	(29.30)
Occupation	22.41	(06.62)	67.35	(07.39)	104.00	(27.61)	135.94	(24.15)
Unemployed	23.80	(05.58)	62.00	(04.74)	78.60	(18.06)	161.40	(18.06)
South/West Europe	23.00	(06.03)	69.41	(11.77)	105.44	(28.00)	136.12	(26.44)
North/West America	23.20	(05.95)	64.88	(16.65)	92.60	(38.06)	145.92	(40.21)
South/West Asia	21.84	(06.25)	63.23	(11.41)	96.15	(27.50)	150.92	(25.41)
Dual-Nationality	26.00	(03.97)	66.90	(09.26)	88.50	(24.24)	140.40	(37.99)
North/South Africa	28.60	(04.50)	64.20	(04.02)	113.00	(28.94)	134.20	(11.27)

To ascertain whether any mean differences are statistically significant, independent-samples t-tests were conducted to compare HPS, BIS, RT and RP means with male and female participants (Appendix-13). Levene's test was significant, therefore equal variances were assumed for total and subscale scores. No significant differences

were found for HPS t (200) = -.287, p > .05, BIS-total t (200) = .704, p > .05, or RP-total t (200) = -.1.713, p > .05, indicating no gender effect. However, RT-total t (200) = .3.04, p < .01, RT-Health/Safety t (200) = .3.618 (male M = 22.89, SD = 7.74; female M =18.65, SD = 7.84), p < .001, and RT-Recreational t (200) = 3.385, p < .001 (male M = 26.18, SD = 10.14; female M =21.13, SD = 9.87) revealed significant gender differences.

One-way ANOVA's (Appendix-14) demonstrated no significant difference for Age on BIS, RT totals or RP total and subscale scores. However HPS F(3, 198) = 4.05, p < .05, BIS-Attentional F(3, 198) = 4.162, p < .05, RT-Ethical F(3, 198) = 2.88, p < .05 and RT-Health/Safety F(3, 198) = 2.55, p < .05 revealed significant differences. Pair-wise comparisons using Tukey post-hoc tests demonstrated two statistically significant comparisons (p < .05). Participants aged 16-21 scored significantly higher on HPS (M difference = 4.37), BIS-Attentional (M difference = 3.46), RT-Ethical (M difference = 4.65) and RT-Health/Safety (M difference = 5.48), compared to low-scoring participants aged 34 and over.

There was no significant difference for nationality on HPS, BIS, RT and RP totals. However, BIS-Non-Planning F(4, 197) = 2.706, p < .05, BIS-Motor F(4, 197) = 2.738, p < .05, RT-Health/Safety F(4, 197) = 2.427, p = .049, RT-Social F(4, 197) = 3.182, p < .05, RP-Social F(4, 197) = 6.145, p < .001, produced significant overall differences. Pair-wise comparisons using Tukey post-hoc tests, revealed a statistically significant comparison (p < .05). South/West European participants scored significantly lower on RP-Social (M difference = 5.93), compared to North/West American, who scored significantly higher.

There was also no significant difference for Education/Occupation on HPS, BIS, RT and RP totals. However, BIS-Attentional F(2, 199) = 3.803, p = < .05, and RP-Financial F(2, 199) = 3.390, p = < .05, produced significant overall differences. Pair-wise comparisons using Tukey post-hoc tests demonstrated two statistically significant comparisons (p < .05). Those in Education scored significantly higher on RP-Financial (M difference = 8.13), compared to Unemployed, who scored significantly lower.

Bivariate Analysis

Pearson's Correlation Coefficient (r) provides descriptive measures of relationships between pairs of continuous variables, in this case HPS (DV) on IS, RT and RP. Scattergrams were plotted, which enabled visual inspection of linearity. Table 4 shows correlations of all variables used in the analysis.

The HPS showed statistically significant moderate positive correlations for: BIS- total r(200)= .35, p = < .01 = r^2 = .12 (12.25%); BIS 2nd order Attentional r(200)= .44, p = < .01 = r^2 = .19 (19.36%); and Motor r(200)= .34, p = < .01 = r^2 = .11 (11.56%). However weak positive correlations were reported for BIS 2nd order-Non-planning r(200)= .11, p = < .05 = r^2 = .01(1.4%).

RT total and subscale scores reported statistically significant weak positive correlations: RT-total r(200)= .23, p = < .01 = r^2 = .05 (5.7% variation); RT-Ethical r(200)= .15, p = < .05 = r^2 = .02 (2.4%); RT-Financial r(200)= .16, p = < .01 = r^2 = .02 (2.8% variation); RT-Health/Safety r(200)= .19, p = < .01 = r^2 = .03 (3.88%); RT-

Recreational $r(200) = .23$, $p = < .01 = r^2 = .05$ (5.5%); RT-Social $r(200) = .11$, $p = .06 = r^2 = .01$ (1.2%).
RP-total and subscale scores reported non-significant weak/negligible negative correlations: RP-Total $r(200) = -.06$, $p = > .05$ (.16) $= r^2 = .00$ (0.4%); RP-Ethical $r(200) = -.06$, $p = > .05$ (.18) $= r^2 = .00$ (0.4%); RP-Financial $r(200) = -.09$, $p = > .05$ (.09) $= r^2 = .00$ (0.8%); RP-Health/Safety $r(200) = -.06$, $p = > .05$ (.20) $= r^2 = .00$ (0.3%); RP-Recreational $r(200) = -.08$, $p = > .05$ (.11) $= r^2 = .00$ (0.7%); RP-Social $r(200) = .02$, $p = > .05$ (.35) $= r^2 = .00$ (0%).

It can be concluded that the HPS correlated significantly ($p < .01$) with total BIS and RT. However correlations found between HPS and RP were non-significant. This relationship can be seen in Figure 2, 3 and 4.

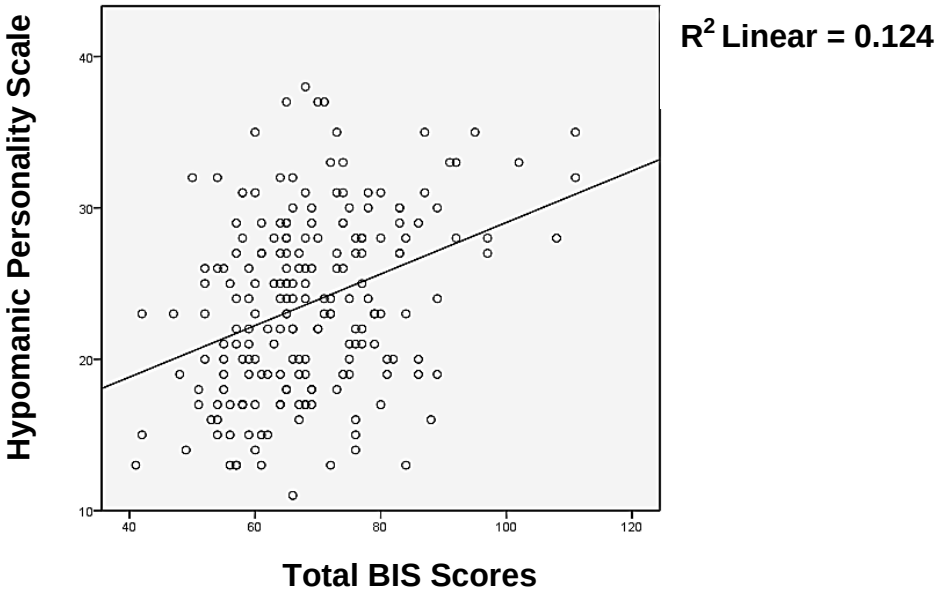

Figure 2: Plots illustrating HPS and BIS relationship

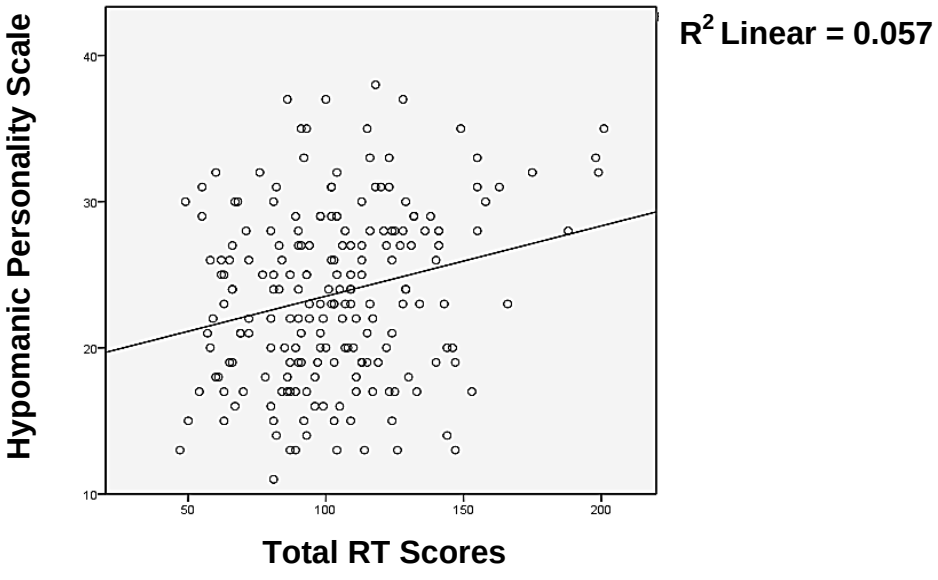

Figure 3: Plots illustrating HPS and RT relationship

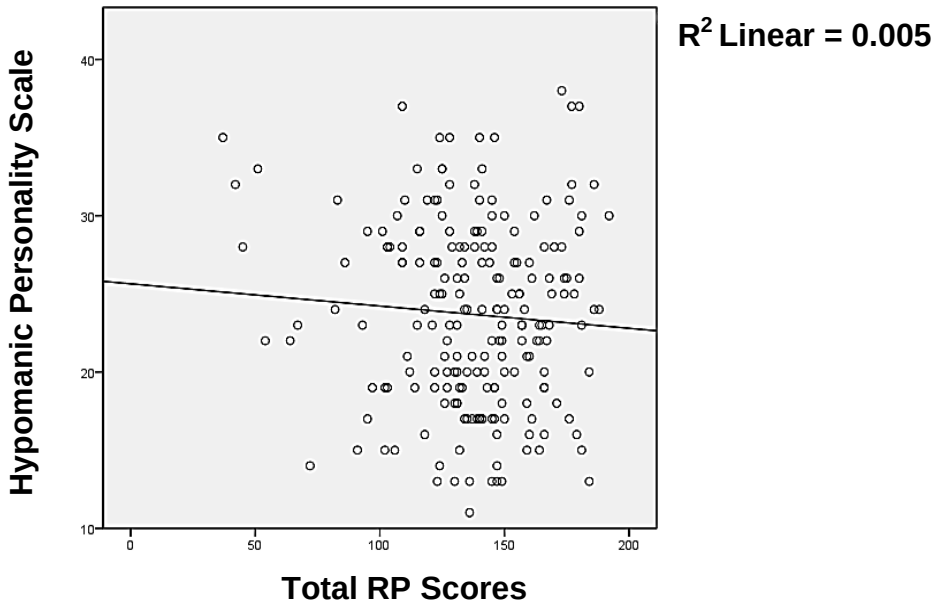

Figure 4: Plots illustrating HPS and RP relationship

Table 4 Correlations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1) HPS	-																						
2) BIS (1st): Attention	.259**	-																					
3) BIS (1st): Cog-Instability	.489**	.380**	-																				
4) BIS (1st): Motor	.360**	.294**	.499**	-																			
5) BIS (1st): Perseverance	.151*	.131*	.213**	.381**	-																		
6) BIS (1st): Self-Control	.147*	.323**	.255**	.533**	.310**	-																	
7) BIS (1st): Cog-Complex	.045	.187**	.111	.439**	.385**	.494**	-																
8) BIS (2nd): Non-Planning	.119*	.305**	.223**	.568**	.394**	.903**	.820**	-															
9) BIS (2nd): Attentional	.442**	.852**	.808**	.470**	.204**	.351**	.181**	.321**	-														
10) BIS (2nd): Motor	.341**	.282**	.475**	.933**	.687**	.539**	.494**	.599**	.448**	-													
11) Total BIS Scores	.352**	.543**	.579**	.836**	.559**	.775**	.661**	.837**	.674**	.874**	-												
12) RTS: Ethical	.157*	.196**	.216**	.334**	.300**	.361**	.341**	.407**	.247**	.379**	.439**	-											
13) RTS: Financial	.168**	.218**	.205**	.350**	.258**	.169**	.091	.156*	.255**	.375**	.324**	.488**	-										
14) RTS: Health/Safety	.197**	.235**	.261**	.425**	.287**	.398**	.256**	.389**	.297**	.445**	.477**	.686**	.464**	-									
15) RTS: Recreational	.236**	.246**	.340**	.336**	.205**	.265**	.069	.209**	.349**	.343**	.364**	.454**	.462**	.567**	-								
16) RTS: Social	.110	.034	.295**	.429**	.245**	.203**	.077	.172**	.189**	.432**	.336**	.185**	.290**	.360**	.476**	-							
17) Total RTS Scores	.239**	.257**	.357**	.494**	.339**	.371**	.212**	.349**	.366**	.520**	.515**	.739**	.720**	.825**	.829**	.604**	-						
18) RPS: Ethical	-.064	-.171**	-.153*	-.202**	-.266**	-.254**	-.241**	-.287**	-.196**	-.262**	-.314**	-.409**	-.355**	-.345**	-.300**	-.167**	-.420**	-					
19) RPS: Financial	-.092	-.155*	-.229**	-.275**	-.337**	-.266**	-.241**	-.295**	-.228**	-.347**	-.367**	-.352**	-.394**	-.354**	-.291**	-.244**	-.433**	.665**	-				
20) RPS: Health /Safety	-.060	-.220**	-.241**	-.251**	-.277**	-.270**	-.198**	-.276**	-.277**	-.305**	-.355**	-.398**	-.423**	-.452**	-.344**	-.193**	-.485**	.772**	.657**	-			
21) RPS: Recreational	-.084	-.195**	-.260**	-.267**	-.301**	-.232**	-.174**	-.239**	-.271**	-.327**	-.346**	-.336**	-.399**	-.346**	-.529**	-.330**	-.530**	.600**	.608**	.665**	-		
22) RPS: Social	.026	.008	-.114	-.275**	-.242**	-.190**	-.251**	-.249**	-.059	-.310**	-.275**	-.269**	-.289**	-.230**	-.304**	-.392**	-.391**	.465**	.445**	.420**	.573**	-	
23) Total RPS Scores	-.069	-.183**	-.247**	-.310**	-.348**	-.296**	-.268**	-.328**	-.256**	-.379**	-.405**	-.431**	-.456**	-.424**	-.435**	-.322**	-.554**	.855**	.827**	.863**	.848**	.698**	-

Note intercorrelations for participants scores (N = 202) are represented below the diagonal; asterisk = (**) $p < .01$ (1-tailed) and (*) $p < .05$ level (1-tailed) significance.

Collinearity diagnostic tests were carried out as correlations ≥.70 were reported. No collinearity was found; therefore multiple regression (*R*) analysis was initiated.

Multiple Regression Analyses

A series of *R* analyses were performed to examine whether criterion variable (DV; HPS) scores could be predicted on the basis of (IV's) BIS, RT and RP scores (Appendix-15). Table 5, 6, and 7 display the unstandardised regression coefficients (*B*), standard error coefficient (*SE B*), standardised regression coefficients (*β*), absolute *t*-values and significance level for each *R* analysis.

Impulsivity-(BIS)

The first and second *R* analyses examined whether HPS-scores could be predicted on the basis of 2nd order subscales and BIS-total. Individual predictor results can be seen in Table 5.

Table 5
Multiple Regression of BIS total, 1st and 2nd on HPS score

Variable: BIS	*B*	*SE B*	*β*	*t*	Sig.
2nd Non-Planning	-.171	.081	-.163	-2.103	.037**
2nd order Attentional	.559	.105	.372	5.346	.000*
2nd order Motor	.291	.088	.272	3.304	.001*
BIS-Total	.170	.032	.352	5.313	.000*

* p = <0.001. ** p = <.05.

BIS 2nd order subscales were significant, F = 20.586 (3, 198), p < .001. The adjusted r^2 = .226 indicates that 22.6% of the variability can be accounted for, as 2nd order subscales Attentional (β = 0.372, t = 5.346, p <.001) and Motor (β = 0.272, t = 3.304, p <.001) positively predicted HPTs. Whereas Non-Planning (β = -0.163, t = -2.103, p <.05) negatively predicted HPS-scores at a significant level. BIS-total was also significant, F = 28.226 (1, 200), p <.001. The *adj* r^2 = .119 indicates that 11.9% of the variability can be accounted for, as BIS-total (β = 0.352, t = 5.313, p <.001) positively predicted HPS-scores at a significant level.

Risk-Taking-(RT)

The third and fourth *R* analyses examined whether HPS-scores could be predicted on the basis of RT-subscales. Predictor results can be seen in Table 6.

Table 6
Multiple Regression of RT-subscales and total on HPS score

Variable: RT	*B*	*SE B*	*β*	*t*	Sig.
DOSPERT- RT-total	.048	.014	.239	3.478	.001*

$p \leq .001$*

Results for RT-subscales were not significant, F = 2.678 (5, 196), p > .05. The *adj* r^2 = .040 indicates that 4% of the variability can be accounted for. It can be ascertained

that the scores for Ethical (β = 0.00, *t* = .004, *p* > .05), Financial (β = 0.045, *t* = .679, *p* > .05), Health/Safety (β = 0.078, *t* = .737, *p* > .05) and Recreational (β = .173, *t* = 1.869, *p* > .05), positively predicted HPS-score, whereas, Social (β = -0.17, *t* = -.211, *p* > .05) predicted a negative relationship. All four relationships were non-significant.. However, RT-total was significant, *F* = 12.10 (1, 200), *p* < .001. The *adj* r^2 = .052 indicates that 5.2% of the variability can be accounted for, as RT-total (β = 0.239, *t* = 3.478, *p* ≤ .001) positively predicted HPS-scores at a significant level.

Risk-Perception-(RP)

The fifth and sixth *R* analyses examined whether HPS-scores could be predicted on the basis of DOSPERT RP-subscales and total. Results were not significant, *F* = 2.678 (5, 196), *p* > .05. The *adj* r^2 = -.005 indicates that no variability can be accounted for. It can be ascertained that Health/Safety (β = .043, *t* = .348, *p* > .05) and Social (β = .126, *t* = .1.423, *p* > .05), positively predicted HPS-score, however relationships were non-significant. Whereas Ethical (β = -.028, *t* = -.235, *p* > .05), Financial (β = -.088, *t* = -.853, *p* > .05), and Recreational (β = -.114, *t* = -1.059, *p* > .05) negatively predicted HPS-score, at a non-significant level. Results were also insignificant for RP-total *F* = .955 (1, 200), *p* > .05. The *adj* r^2 = .000 indicates that no variability can be accounted for. RP-total (β = -.069, *t* = -.977, *p* > .05) negatively predicted HPS-scores at a non-significant level, nonetheless, this inverse relationship can still be implied.

Discussion

This investigation explored the effects of impulsivity and risk on HPTs in a non-clinical international sample. Consistent with DSM/ICD distinctions of mania severity and hypomanic episodes (Benazzi, 2007) and previous research (e.g., Krumm-Merabet & Meyer, 2005), impulsivity and risk-taking illustrate a reliable dose-response relationship. This relationship proposes increased impulsivity and risk-taking behaviours may result in greater HPTs, as significant strong positive correlations were found for BIS-total and subscales, and DOSPERT-RT total. Such conclusions are consistent with H1 and H3, and support comparable research (e.g., Maremmania *et al*., 2004; Kwapil *et al.,* 2005; Swann *et al.,* 2007) indicating positive correlations between impulsivity (state-and-trait), mania severity, BP I and II. Psychological accounts contend that such interconnections are in fact characterisations of hypomania and mania (Mason *et al.,* 2011). Fletcher *et al.* (2013b) theorised that these relationships are driven by internal personal appraisals and conflicting mood-and-cognitive changes, which produce extreme behavioural reactions.

Impulsivity

Impulsivity has been regarded as a core feature of hypomania, HPTs and BP (Molz *et al*., 2013; Swann *et al*., 2009), and significantly associated with reward-seeking and high-risk behaviours (Alloy *et al*., 2009; 2012). Research using the BIS has provided evidence for trait-and-state related impulsivity in BP, mania and hypomania (e.g., Swann *et al*, 2001; Peluso *et al*., 2007). Validated research reports almost identical mean BIS-total scores between 59.9-60.8 in non-clinical samples and euthymic patients (Lewis *et al*., 2009; Swann *et al*., 2003); however, mean BIS-total for this investigation were 68.59. This variance can somewhat be attributed to

administration differences, unrestricted sampling criteria and biased sample (87% Education).

Moderate positive correlations for BIS-total, Attentional and Motor-Impulsivity were found with HPS. Multiple regression analyses demonstrated that when BIS-subscales were constant, BIS-total positively predicted hypomanic symptoms, with Motor and Attentional subscales producing an independent relationship. This is consistent with previous hypomanic research (e.g., Fulford, Johsnon & Carver, 2008), which frequently documented correlations between impulsive and narcissistic tendencies (Meads & Bentall, 2008). Thus impulsivity-subscales have been confirmed to directly influence particular aspects of affective states and in pursuit of immediate reward (Zapolski *et al.,* 2010).

Such findings are greatly supported within clinical populations. Motor-impulsivity is associated with an inconsistent lifestyle, spur of the moment behaviour and rash decision-making (Jasinska *et al*., 2012). Motor-Impulsivity has been frequently reported in student and younger populations (Deck *et al.,* 2010). Swann *et al*. (2008) established that BIS-total scores were increased during mania and hypomania; with Motor and Attentional-Impulsivity significantly related to manic scores. Miller *et al.* (2004) claimed that this consistent finding is attributable to reward hypersensitivity (Meyer *et al.,* 2008) and connections between impulsivity, impetuousness and venturesomeness. Furthermore, Attentional-Impulsivity assesses the ability to focus on specific tasks and the susceptibility for racing and interrupted thoughts (Winstanley *et al*., 2010). This provides further support for the notion of 'an unquiet mind' within certain mood disorders (Ghaznavi & Deckersbach, 2012).

Findings in this investigation illustrated Attentional-Impulsivity appeared to be amplified in younger participants (16-21), compared to older participants (34+), in line with H2. Inability to sustain attention and amplified distractibility is a DSM-IV-TR symptom of hypomanic episode (criterion B4 and B5). Thus Swann (2001; 2007; 2008) established a linear relationship between impulsivity and manic symptoms in individuals with BP I and II, as indexed using BIS.

It can be concluded that HPTs and potential hypomanic episodes are associated with total-Impulsivity and specifically Motor and Attentional-Impulsivity. This is in-line with H2, ICD defined hypomanic disorder suggesting concentration and attention may be impaired; and previous clinical/psychiatric research (Dougherty, 2000). This investigation demonstrates the likely importance of impulsivity within non-clinical samples. Many have confirmed the significance of 'impulsive personality' on HPTs and hypomania, nonetheless causality remains unclear.

Risk-Taking

Excessive involvement in high-risk behaviours is a recognised risk-factor for hypomania (Fletcher *et al.,* 2013a). Previous research has demonstrated that mood fluctuations can promote excessive RT in individuals with HPTs, hypomania and mania (e.g., MacDonald & Marineau, 2002; Perugi *et al.,* 2011). Blanchette & Richard (2010) suggested that reward hypersensitivity and complex physiological and behavioural changes promote impulsive behaviour, often with severe consequences (Parker, 2008). Hypersensitivity towards unconventional high-risk and sensation-

seeking behaviours can act as indicators for potentially unstable and dysphoric life events set to come (Fornaro *et al.,* 2013).

Weak positive correlations for RT-total and subscales were found with HPS. Multiple regression analyses verified that when RT-subscales were constant, RT-total positively predicted hypomanic symptoms at a significant level. Such findings are not consistent with research documenting risky-behaviours as highly domain-specific (Hanoch, Johnson & Wilke, 2006; Blais & Weber, 2006), or historical BP research frequently associating specific RT behaviours with impulsive personality traits and poor decision-making (Webb *et al*., 2012; Orum, 2012). However clinical correlations between hypomania and RT could be attributed to reduced punishment sensitivity, particularly regarding risky-decision formulation (Mason *et al.,* 2011). Increased involvement in potentially dangerous, high-risk and pleasurable activities corresponds with DSM-criterion B7 of a hypomanic episode (APA, 2000).

RT-Ethical and RT-Health/Safety scores were higher in younger participants (16-21) compared to older participants (34+), with RT-total, Health/Safety and Recreational greater in male participants. This is partially in-line with H2 and consistent with research documenting gender (Arnold, 2003) and age (McCade *et al.,* 2013) effects within mania and BP. Furthermore, Byrnes, Miller and Schafter (1999) concluded that "male participants clearly take more risks than female" (p.377) which is in accordance with 'stimulating-risks' that alter arousal levels and increase thrill-seeking propensity (Zaleskiewicz, 2001). As this is a non-clinical sample it is necessary to note that heightened risk-behaviours could be interpreted as normal in adolescence and early adulthood (Giedd, 2004).

Risk-Perception

Similarly variations in perceived-risk have also been associated with many psychological conditions including hypomania, mania, BP and depression. As hypomanic individuals and those presenting HPTs, have been regarded as addiction-prone (Meyer, 2008), it is unsurprising that impulsivity and RP variations have modulated the occurrence of RT (Ryb *et al*., 2005; Cooke & Jones, 2009), regardless of consequence. However, very weak/negligible negative correlations for RP-total and Ethical, Financial and Recreational subscale scores and very weak/negligible positive correlations for Health/Safety and Social were found with the HPS. Multiple regression analyses demonstrated that when RP-subscales were constant, no significant independent relationship was found. Therefore, RP is not significantly related to future hypomania, mania or BP. This is not consistent with previous research (e.g., Slovic *et al.,* 2002; Green *et al.,* 2007) which has established associations between hypomania, impulsivity and the effects of RT on RP generation, particularly for those sustaining injury from self-destructive behaviours (Michalak *et al.,* 2006).

Despite the common occurrence of RT during hypomania, psychological-risk-dimensions (dread, controllability, familiarity, knowledge) have been suggested to influence RP in risky-situations (Blais & Weber, 2006). However, it is apparent that the immediate gratification and adrenaline rush received in a euthymic state, overrides the supplementary negative consequences and guilt experienced post-hypomanic mood (Fletcher *et al.,* 2013b). Bontempo, Bottom & Weber's (1997) empirical investigation found cultural differences in perception of riskiness.

Nationality differences have been found in this investigation, which were in-line with H2 and extend previous research. South/West European participants reported significantly lower RP-Social scores than North/West American. Therefore it can be determined that DOSPERT-social risks e.g., "disagreeing with an authority figure on a major issue", are perceived high-risk in North/West American cultures. This is in line with sociocultural differences related to personality changes and social norms in culturally developed societies (Oltedal *et al*., 2004). However, as this international sample contains considerably varied demographic sizes, nationality differences must be interpreted cautiously. It can be ascertained that HPTs and potential hypomanic episodes may be associated with impulsive high risk-behaviours.

This investigation explored the effects of impulsivity, RT and RP on HPTs, in a non-clinical sample. It can be ascertained that in line with previous research, specific components of impulsivity and RT may potentially influence the development of hypomania, mania and BP sub-clinically. However, the processes underlying this relationship require greater examination, particularly so regarding demographic interaction effects. As this investigation used a self-report methodology, failed to examine for potentially conflicting personal illness, and primarily consisted of students, the findings simply offer a small insight into the consequences of this complex relationship. However they could provide further evidence for the notion of hypomanic tendencies and proneness as normal personality traits (e.g., Meyer *et al*., 2007).

Future Research

Future research could examine neuropsychological effects of specific impulsive and risk components, by using multi-method measurements in broadened clinical and non-clinical populations, principally on those displaying affective, cognitive and behavioural dysregulation. If research was extended and intervention programmes implemented, there could be a substantial reduction in the percentage of under-and-miss diagnosed individuals. It is of particular importance to identify and intervene when individuals present with chronic HPTs and episodes, as much research has recognised an increased risk of developing full blown mania and BP, if left untreated.

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