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Sensation seeking, drug use, and high contact sports

Abstract

Research question: Studies report associations between sensation seeking and risky behaviour, including drug use, suggesting sensation seeking may involve a vulnerability to health compromising behaviour. Findings on sports as a protective factor against drug use are mixed. The present study was designed to examine whether young adults who participate in high contact sports have an increased likelihood to use drugs, and if the likelihood of drug use is mediated by sensation seeking.

Research methods: This quantitative, correlational study included analysis of 463 individuals' (218 in high contact sports and 245 in non-contact sports) responses to online surveys.

Results and findings: Results show that high contact sport is associated with recreational drug use, particularly for males. Sensation seeking is only related to drug use for those engaging in high contact sport.

Implications: Sensation seeking may not be useful in predicting drug use directly but can be useful in predicting drug use in high contact sport.

Keywords high contact sports; recreational drug use; sensation seeking

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Introduction

The personality trait, sensation seeking (SS), is defined by a tendency to seek "*varied, novel, complex, and intense situations and experiences, and the willingness to take physical, social, and financial risks for the sake of such experience*".[1] Its expression can be influenced by biological and environmental factors and can be a predictor of both positive and negative risk behaviour by Hansen & Breivik.[1] Engagement in high physical risk activities have been classified as normative (i.e., sports participants), prosocial (i.e., helpful occupations such as firefighting), and antisocial groups (i.e., criminal activity).[2] It appears that risk takers from the normative group are more venturesome and impulsive.[3]

Sensation seeking has been shown to be a factor in risk taking and health compromising behavior to the extent it has been targeted for substance use interventions.[4] However, as risk is based on the cost benefit evaluation of drug use by an individual, it is quite feasible that the rewards of successful social integration (e. g. more relevant in rugby than paragliding) may outweigh any perceived disadvantages in physical health in this cohort. Consequently, it may be reasonable to question the overall relevance and utility of SS as a construct for predicting risk behaviour and health outcomes.[5] Sensation seeking has been largely investigated in adolescent from age 10 to 15 and has been linked to puberty and sexual development.[6,7] It is generally higher in males than females,[5] and tends to peak around age 15 and remain stable or decline through emerging adulthood.[7,8]

There is extensive evidence of the health and wellbeing benefits of physical activity and exercise.[9–12] The strength of evidence has led to recommendations and guidelines on prescribing exercise as a treatment for both physical and mental health problems.[13,14] Engaging in contact sports and challenging activities provides a suitable level of physical activity and exercise to provide the benefits described above. Among other personality traits, sensation-seeking has been identified as a predictor of challenging and high energy physical activities,[15,16] and as a potential protective health-related factor.[17] Conversely, research has also highlighted the negative outcomes of sensation-seeking as antisocial behaviour, criminality,[18] drug use, and abuse.[19] In essence, sensation-seeking (SS) is a double-edged sword in that it predicts high risk behaviours which can have both positive and negative consequences.[20] It is this potential double effect that is of interest in regard to sport.

The prevalence of recreational drug use initiation in adolescence, aided by an increased acceptance and reduced perception of risk, continues to be problematic well into adulthood.[21] Participation in sports has been shown to be a potential protective factor against drug use among young adults because individuals who partake in sports have generally shown decreased drug usage.[22,23] Research has also shown that this link is not equal for all sports, and high contact sports have been linked with greater drug use.[24] This suggests that high contact sports may be a facilitator of drug use rather than a protective factor.

Drane, Modecki, and Barber[25] suggested that individuals high in SS are likely to initiate risk behaviours such as substance use and become established users in comparison to individuals low in SS. There is evidence that sensation seeking interacts with social and emotional maturity to increase vulnerability in adolescence and emerging adulthood towards risky behaviours.[8] Franques and colleagues[19] suggested that the expression of SS is in fact a human vulnerability to addiction and made a comparison to animal research, which highlights how novelty seeking rats are strongly influenced by the underlying biological mechanism involving the mesolimbic dopamine (DA) system of the brain.[26] Studies have shown links between SS and binge drinking[25] and between smoking and drinking,[27] as well as between other risk behaviours including active and extreme sports.[28] Minkwitz et al.,[17] detected a similar effect of SS on physical activity, highlighting a preferred pattern of high intensity sports amongst high SS individuals.

To date, researchers have not compared the effect of sensation seeking to the effect of participation in sports. While researchers are often quick to assume that participation in sports leads to reduced drug use, it is possible that the effect stems from a common predictor: sensation seeking, acting on both drug use and sports participation.

For example, those with higher SS may tend to participate in both high intensity sports and drug use, while those with lower SS may be drawn to low or no contact sports and have an intrinsic tendency to avoid drug use.

This study aimed to test the relationship between sensation seeking, recreation drug use and high contact sport based on previous findings that both sensation seeking and participation in high contact sport are associated with greater use of recreational drugs,[19,24] while more generally participation in sport is protective against drug use.[22,23] The question explored is whether emerging adults who participate in high contact sports have an increased likelihood to use drugs, or whether the likelihood of drug use and participation in high contact sports are linked to the trait of sensation seeking.

Method

Design

This research employed a quantitative, correlational research design to test the strength of the association between the constructs.[29]

Participants

The sample consisted of 463 individuals, 250 males and 213 females. A total of 218 individuals participated in high contact sports and 245 individuals participated in non-contact sports. Age of participants ranged from 18 to 25 years, with an average of 21.33 years. A power analysis was conducted using G*Power (3.1.9) to determine the minimum sample size necessary to address the research questions.[30] A binary logistic regression was used with a power of .95, an error probability on .05, and a significant alpha of .05. Applying these parameters, it was determined that a minimum of 85 participants would be sufficient for the analysis.

Measures

Sports participation: Participants were asked to indicate if they participated in sport and if yes, to list the sports they engaged in on a regular basis. This was then used to categorise the sample into high contact sport or not. **High contact sports were defined as any sport in which physical contact between players is an accepted part of play, e. g. football, boxing, or hockey. In this sample the sports in question were rugby, Gaelic football, soccer, and Hurling. Non-contact sports were defined as sports where physical contact between participants is not part of the requirement, e. g. cricket, tennis, volleyball, netball, squash. In this sample the list included, cricket, tennis, badminton, squash, and handball.**

Sensation seeking was assessed using the Arnett Inventory of Sensation Seeking.[31] The AISS comprises of two subscales; Intensity (10 items) and Novelty (10items), and it produces an overall measure for sensation seeking. Using a four-point Likert scale, respondents highlight the extent to which an item describes them; (1) describes me very well, (2) describes me somewhat, (3) does not describe me very well, (4) does not describe me at all. Total scores were calculated through an average of the respective items and can range from 1.00 to 4.00. Higher scores reflect a preference towards sensation seeking. Cronbach alpha for the scales ranged between .83 and .86.[31] The AISS was favoured over the standard Zuckerman´s Sensation Seeking Scale (SSS-V) as it is deemed to be more related to energy expenditure and less sensitive to "age or concerned with physical strength, antisocial or norm-breaking behaviour".[17] The scale Cronbach Alpha in this data was .88 for the overall scale, .81 for Novelty, and .80 for Intensity.

Recreational drug use was assessed using the Recreational Drug Use sub scale of the Shorter PROMIS Questionnaire.[32] The SPQ compromised of 10 items rated on a five-point scale ranging from (0) "Not like me at all" to (5) "Like me". Items included "I particularly enjoy getting a really strong effect from recreational drugs" and "I tend to use drugs as both a comfort and a strength". Scores ranged from 1.00-5.00, with higher scores reflecting higher usage. This self-reported measure has shown high internal consistency and was deemed to be a useful instrument in determining addictive behaviours amongst young adults.[32] The Cronbach alpha for the overall scale was reported to be $\alpha = .89$. In addition, test-retest reliability was reported to be ICC = .77.[32] The scale Cronbach Alpha in this study was .89.

Procedure

An online survey was employed using Qualtrics and participants were invited to participate via an e-mail to a sample of Sports Science students at University. Participants who clicked on the provided link were taken to an information sheet outlining details of the project. After reading this they were taken to a tick box consent form. On completing the consent form they were led to the questionnaire which included four sections and a total of 35 questions. Section one consisted of four demographic questions related to gender, age and two inclusion / exclusion questions based on addiction program and medical or mental health conditions. No one reported either a medical condition or and addiction programme. The questionnaire could be completed in approximately 15 minutes.

The data were extracted from Qualtrics and uploaded into SPSS for Windows. Participants who failed to complete to the full questionnaire were removed. Descriptive statistics were examined for the sample. For nominal variables, frequency and percentage distributions were presented. For continuous variables, such as recreational drug use and sensation seeking, mean and standard deviations were reported. In accordance with the guidelines outlined by George and Mallery,[33] Cronbach alpha were explored and interpreted.

The research question was examined by conducting independent t-tests, multivariate analysis of variance, hierarchical multiple regression, and binary logistic regression to explore if participation in high contact sports were more likely to be sensation seeking or use recreational drugs. Assumptions of normality, homoscedasticity, absence of multicollinearity and lack of outliers were assessed. Normality and homoscedasticity were tested through visual examination of scatterplots. Variance inflation factors (VIF) was measured to assess issues of potential multicollinearity.[34] Potential outliers were identified using standardized values (*z*-scores) and removed from the data if exceeding + 3.29 acceptable cut off point.[35]

Ethics

The Research Ethics Committee of the University approved the study. Participants were informed about the study and informed consent was provided.

Results

Descriptive statistics in the form of means and standard deviations were calculated between high contact and non-contact sports participants and males and females as shown in Table 1. Zero order correlations were sensation seeking with drug use ($r = .45$, $p<.001$), novelty with drug use ($r = .39$, $p<.001$), and intensity with drug use ($r = .43$, $p<.001$).

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Multivariate analysis of variance was used to test for main effects and interactions on sensation seeking and drug use by sport type and sex. There were significant main effects for high and non-contact sports participation on Novelty (F (1, 459) =376.25, p<.001), Intensity (F (1, 459) =324.97, p<.001), Sensation Seeking (F (1, 459) =536.64, p<.001), and Recreational Drug Use (F (1, 459) =172.75, p<.001).

Table 1 Means and standard deviations by sport type and sex

Variable	Sport	Sex	N	Mean	Sd.
		Male	92	22.85	6.23
	Non-Contact	Female	153	19.04	6.46
		Total	245	20.47	6.62
		Male	158	29.54	2.18
Novelty	High contact	Female	60	31.47	2.73
		Total	218	30.07	2.49
		Male	250	27.08	5.26
	Total	Female	213	22.54	7.96
		Total	463	24.99	7.01
		Male	92	23.45	6.09
	Non-Contact	Female	153	19.92	6.17
		Total	245	21.24	6.36
		Male	158	30.43	3.60
Intensity	High contact	Female	60	31.77	4.52
		Total	218	30.79	3.91
		Male	250	27.86	5.76
	Total	Female	213	23.25	7.84
		Total	463	25.74	7.17
		Male	92	46.29	10.02
	Non-Contact	Female	153	38.95	10.49
		Total	245	41.71	10.89
		Male	158	59.97	4.32
Sensation Seeking_	High contact	Female	60	63.23	5.42
		Total	218	60.87	4.86
		Male	250	54.94	9.60
	Total	Female	213	45.79	14.38
		Total	463	50.73	12.86
		Male	92	13.02	2.99
	Non-Contact	Female	153	10.60	1.53
		Total	245	11.51	2.49
		Male	158	22.73	7.39
Recreational Drug Use_	High contact	Female	60	13.87	4.75
		Total	218	20.29	7.84
		Male	250	19.16	7.73
	Total	Female	213	11.52	3.18
		Total	463	15.65	7.17

There were significant main effects for males and females on Novelty (F (1, 459) =33.84, p<.001), Intensity (F (1, 459) =21.69, p<.001), Sensation Seeking (F (1, 459) =6.22, p<.01), and Recreational Drug Use (F (1, 459) =42.63, p<.001). Males and those participating in high contact sports scored higher on all variables. There were interaction effects for sex by high contact sport on Novelty (F (1, 459) =130.69, p<.001), Intensity (F (1, 459) =130.69, p<.001), Recreational drug use (F (1, 459) =130.69, p<.001), and Sensation seeking (F (1, 459) =41.86, p<.001). The interactions are illustrated in Figure 1. Females in the high contact sport category had the highest scores on Sensation Seeking and on its individual dimensions of Intensity and Novelty, while males in the non-contact category had the lowest scores. In terms of drug use males in the high contact group scored highest and males generally scored higher than females on this variable.

To explore this further separate hierarchical regression analysis (HMRA) were carried out for males and females (Table 2).

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Table 2a Hierarchical multiple regression analysis for drug taking for females

	B	SE. B	β
Step1: R^2=.21, f(1, 211)=57.46, p<.001			
Sport contact	3.265	.431	.463***
Step2: R^2 Δ =.01, f(1, 210)=0.67, p=.411			
Sport contact	2.848	.665	.404***
Sensation seeking	.017	.021	.078
***P<.001 Total R^2 =.21			

Table 2b Hierarchical multiple regression analysis for drug taking for males

	B	SE. B	β
Step1: R^2=.37, f(1, 248)=144.88, p<.001			
Sport contact	9.712	.807	.607***
Step2: R^2 Δ =.01, f(1, 247)=0.25, p=.619			
Sport contact	10.094	1.114	.631***
Sensation seeking	-.028	.056	-.035
***P<.001 Total R^2 =.36			

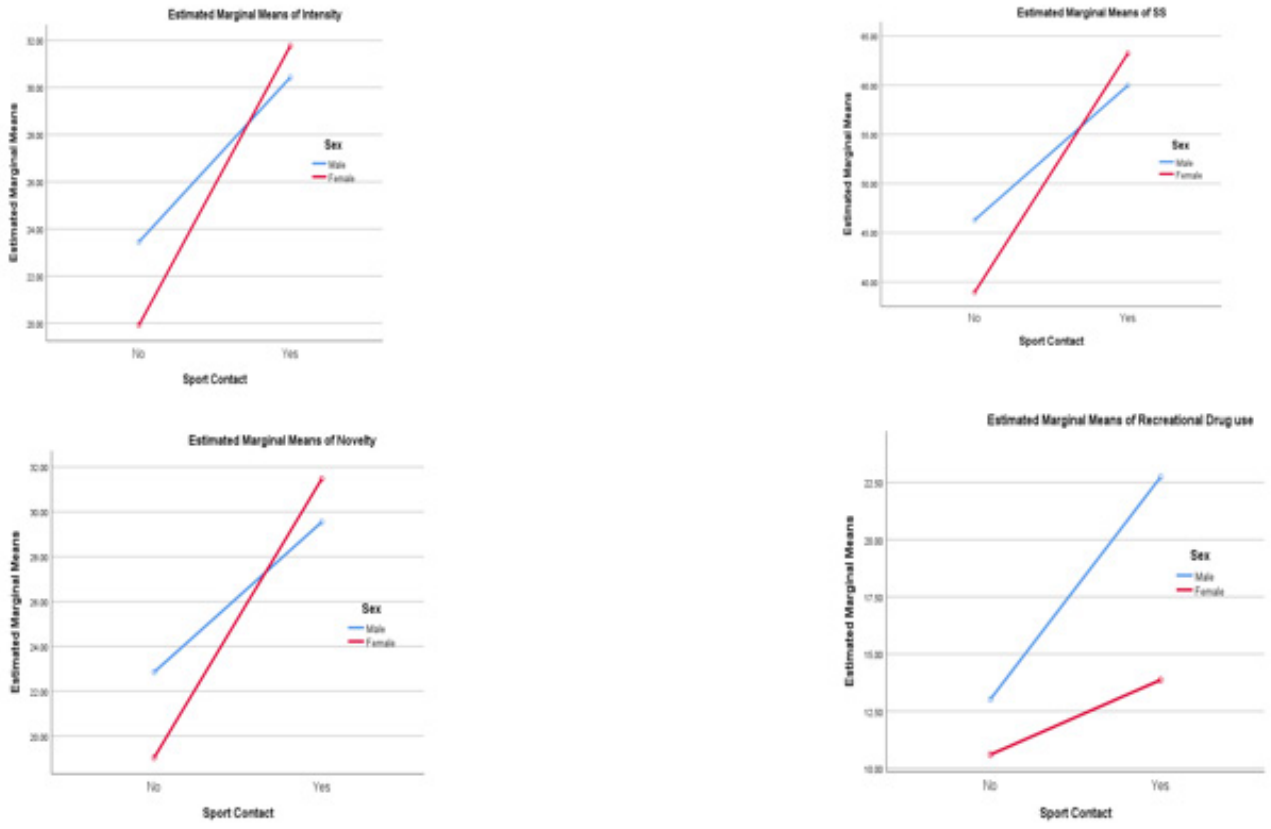

Figure 1 Interaction effects for sport contact type by sex.

Drug use was the dependent variable and sport contact was entered as the independent variable on the first step accounting for 21% of the variance in drug use for females (b =.46, p<.001), and 36% of the variance for males (b =.61, p<.001). Entering sensation seeking on the second step did not add a significant percentage of variance for either females or males.

Path analysis using AMOS 25 tested a model of recreational drug use, sensation seeking and high contact sport engagement (Figure 2). The fit statistics for the model were (χ^2 (1) =3.37, p=.066, CMIN/DF=0.28; CFI=.99; NFI=.99; RFI=.97; IFI=.99; RMSEA=.07). What this model indicates is that high contact sport engagement and sex are the direct predictors of recreational drug use, while the effect of sensation seeking is mediated by high contact sport. In other words, males and those who engage in high contact sport are more likely to engage in drug use, ad sensation seeking only predicts drug use for those engaging in high contact sport.

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Discussion

This study aimed to test the relationship between sensation seeking, recreation drug use and high contact sport based on previous findings that both sensation seeking and participation in high contact sport are associated with greater use of recreational drugs,[19,24] while more generally participation in sport is protective against drug use.[22,23] The findings suggest that young adults who participate in high contact sports may be more likely to use recreational drugs. In addition, there doesn't appear to be a direct relationship between sensation seeking and recreational drug use for the total sample. Instead, the relationship between sensation seeking and drug use is mediated by the choice of high contact sport. Consequently, the present study does not support findings that sensation seeking is a direct predictor of recreational drug use use but rather that the relationship is mediated by behavioural choices such as type of sport.

This study looked at high contact sport rather than high risk sports which may explain the difference in findings from previous research (e. g.[19]) and emphasizes the need to be specific in differentiating between contact and risk. In addition, we looked at recreational drug use rather than drug addiction at a clinical level.

Sensation seeking develops and peaks relatively early in adolescence and tends to remain stable or decline from then on.[5] Much of what we know about sensation seeking has focused on the adolescent years. In previous studies, sensation seeking has been revealed to be a factor in risk taking and health compromising behavior to the extent it has been targeted for substance use interventions.[4] Our findings question the overall relevance and utility of sensation seeking as a construct for predicting risk behaviours and health outcomes in adults.[5]

Contrary to research that supports the view, that sports participation may provide a protective factor toward drug use,[23] findings of the present study are consistent with the research of Veliz et al.[24] They found a strong association between adolescents who participated in high contact sports and recreational drug use. Moreover, Ford[36] found a marked difference in marijuana use between group sports (i.e., soccer and hockey), which indicated higher levels of marijuana use, in comparison to those participating in individual sports (i.e., cross-country and track). This suggests that not all sports are equal in their contribution to positive health outcomes and that group sports dynamics may play a role in drug use.

Steinberg[8] stated that the presence of peers heightens the emotional arousal making "the rewarding aspect of risky situations more salient" (p. 56). He purported that vulnerability to emotional arousal (impulse and regulation) and peer pressure can interfere with sound decision making. This suggests that contextual as opposed to personal attributes may provide a better understanding of why individuals in sports engage in recreational drug use, although personal attributes do play a role.[37] However, whilst this may explain why such activities occur in groups, it does not fully account for individuals in contact sport engaging in riskier behavior more than those in non-contact sports and being more susceptible to substance use.[24]

Ford[36] suggested that some sports may exert more pressure to adhere to the social norms of the group to emphasize identification, motivation, and commitment to the group. Veliz et al.,[24] argued that the risk of injuries in high contact sports may be conducive to acceptance towards opioids to manage pain but did not distinguish between prescription drugs and "other illicit" drugs. The present study was exclusive to recreational drug use, and it cannot be ruled out that participants may have initiated recreational drug use via the prescription path. However, the development of drug use is described as typically based on pleasure followed by the avoidance of pain,[1] with prescription drugs potentially leading to hard drug use.[38]

Risk is assessed equally by adolescents, young adults, and adults alike, and accordingly, reasoning is typically developed by the age of sixteen, but psychosocial maturity continues to develop into young adulthood.[8] The median age of participants in the present study was 21, which is considered young adulthood. This is the age of leveling off or maturity in relation to substance usage.[22] In support of the psychosocial framework of risk behaviour, Veliz and colleagues[24] found that substance use was initiated in early years amongst high contact sports individuals, suggesting sociocultural factors play an important role in the initiation and maintenance of drug use in this type of sport.[22]

It is difficult to ascertain if the participants in the present study initiated recreational drug use at an early age and continued into their twenties whilst continuing to play high contact sports, or if high contact sports inadvertently provided an environment that enabled rather than protected against the cultivation of health compromising behaviours. Injunctive norms can be particularly influential in this age group and in sports participation. Social norm theory[39] suggestss that individuals often overestimate the level of engagement others have in risk behaviour. This inaccurate perception in turn leads them to partake in that same risk behaviour at an increased level based on this skewed view of normal behaviour for their reference group. Every person who participates solidifies such a belief and further perpetuates the behaviour.[40] Moreover, such injunctive norms indicate that perceptions of proximal reference groups (i.e., parents and peers) are positively associated with substance use.[41]

Sports participation can enable both health promoting and health compromising behaviour. Practitioners should consider how contact sports may inadvertently facilitate the use of recreational drugs by providing "socially organised opportunities to learn risk behaviours together and normative expectations that they be performed together".[37]

The present study was exploratory with a relatively large sample. However, a broader range of risk behaviours might have been considered to determine if the findings only applied to drug use. The use of self-report instruments have the usual limitations.[42] Data were derived solely from a single cultural sample and, generalisability cannot be assumed when considering differences in policies, cultures, and environmental factors across populations.[43,44]

Further research is recommended on the connection between group dynamics and individual factors in high contact sports. Additionally, it is important to consider that sports involvement may not provide a protective factor towards drug use (Rambaree et al., 2018) as is typically thought. Participation in certain group sports may actually put individuals at increased risk for drug use.

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Authors' contributions: Both authors contributed to the study conception and design, material preparation, data collection and analysis. The first draft of the manuscript was written by Elizabeth Richardson and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Conflicts of interest

Neither author has any conflict of interest.

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