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The analysis of the bipolarity features in students of arts and students of technology

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Summary

Background. The aim of the research was to assess the prevalence of the bipolar spectrum features among students of a variety of faculties, by dividing them arbitrarily into ‘art’ or ‘technology’ cohorts.

Material and methods. 120 subjects were examined, including 57 students of arts, and 63 students of technology. The tools used included a basic socio-demographic questionnaire and the Hirschfeld Mood Disorder Questionnaire (MDQ).

Results. The bipolar spectrum features (as identified by the MDQ responses) were significantly more prevalent among the students of arts, as compared to the students of technology (28.2% vs. 4.8%, $p \leq 0.001$; OR = 7.8; CI 95%: 2.13–28.51; $p \leq 0.01$). Moreover, in comparison to the students of technology, the students of arts were more likely to: 1) report mood patterns of intermittent ‘highs’ and ‘lows’ (49.1% vs. 15.9%, $p \leq 0.0001$; OR = 5.11; CI 95%: 2.18–11.99; $p \leq 0.001$); 2) seek for psychiatric or psychological support (12.3% vs. 1.5%; $p \leq 0.05$; OR = 5.2; CI 95%: 1.79–15.21; $p \leq 0.01$); 3) have a history of utilisation of psychotropic medications (31% vs. 7.9%, $p \leq 0.001$; OR = 8.7; CI 95%: 1.03–72.9; $p \leq 0.05$). They were also more likely to use psychoactive substances (other than alcohol).

Conclusions. The considerable prevalence of the bipolarity features (as measured by the MDQ), combined with higher prevalence of intermittent periods of elevated or depressed mood, higher likelihood of seeking for psychiatric or psychological treatment, and higher prevalence of using psychoactive medications/substances in the cohort of the students of arts indicate a significant association between artistic talents and creativity, and the bipolar spectrum disorders.

Keywords: creativity, bipolar spectrum, bipolar disorder

Introduction

A substantial body of evidence indicate a link between various modalities of creativity and mood disorders – particularly of the bipolar type. The methodological backgrounds of these contributions involve either analysis of biographies of some renowned artists, scientists, etc., or the empirical testing of the relationships between the bipolarity features and creativity (in a broad sense) in specific populations.

One of the more important research endeavours in this field is the fifteen-year longitudinal study by the American scholar, Nancy Andreasen. In 1974 she found that 80% of the writers investigated ($n = 30$) had shown symptoms of affective disorders, and nearly half of them had met the diagnostic criteria of bipolar disorder (BD). By comparison, the prevalence rate of bipolar disorder (BD) among the ‘non-artist controls’ was as low as 10% [1]. This remains in line with the evidence provided by other researchers. Accordingly, Felix Post’s posthumous analysis of life histories revealed the occurrence of depression in 72% of the writers studied [2], and Arnold Ludwig, who analysed a group of 59 female writers, diagnosed depressive episodes in more than half of them, as well as manic states in one fifth of the participants [3]. The latter author had also scrutinized the biographies of some famous people, and found that affective disorders were more prevalent in the ‘creative ones’ (artists, writers, and musicians), as compared to soldiers or scientists [4].

The strand of empirical research includes the longitudinal study of Swedish pupils, published in 2010 by James MacCabe et al. The cited authors concluded that subjects who demonstrated outstanding school performance aged 15–16 were approximately four-fold more likely to be diagnosed with BD in the adulthood (17–31 years of age), in comparison with the sample of ‘average students’. Of note, the risk was particularly related to high grades in humanities classes [5]. Some important findings have also arisen from studies where patients suffering from BD were compared to students of arts, ‘creative individuals’ or controls (see: Nowakowska et al. 2005; Santos et al. 2007). Accordingly, in one of those studies the researchers found that both the patients with BD and the students of arts (as compared to the subjects with unipolar depression or the healthy controls) scored significantly higher on the general scale of creativity (when the measurements were made using the Baron-Welsh Art Scale, i.e. ‘the BWAS method’). Also, in the context of temperament, the comparison of the above-mentioned samples led to the conclusion that the patients with affective disorders, as well as the students of arts, scored higher on the cyclothymia- and dysthymia-related items of the TEMPS-A (in comparison with the healthy individuals) [6–8].

While being the subject of multiple studies, the association between mood disorders or their spectrums (especially of the bipolar nature) and creativity in arts and humanities is yet to be determined. The need for broader research into the issue set out above prompted our attempts to investigate the bipolar spectrum features among students of various faculties.

Material and Methods

The sample analysed consisted of randomly selected students of Art and Technology Faculties of various colleges (located in Cracow, Poland), who agreed to participate in

the study. The 'arts' cohort consisted of the students of the Cracow Music Academy, The State Drama School, and the Academy of Fine Arts (fine and graphic arts). The students of virto-technology and electro-technology, power engineering, management and production engineering, mechatronics, materials engineering, mining and geology, computer science, civil engineering and environmental engineering were enrolled in the 'technology' cohort.

A total of 120 subjects (60 men and 60 women) took part in the study. The first group (ART) consisted of 57 individuals, while 63 subjects were ascribed to the second group (TECH) (see Tab. 1).

Table 1. Academic characteristics of the sample studied

Faculty	Number of subjects
GROUP 1 (ART)	n = 57
Music	34
Acting	17
Fine arts	4
Graphic arts	2
GROUP 2 (TECH)	n = 63
Virto-technology and electro-technology	31
Power engineering	2
Management and production engineering	2
Mechatronics	12
Materials engineering	6
Mining and geology	1
Computer science	7
Civil engineering	1
Environmental engineering	1

The participants were asked to fill in a catamnestic questionnaire (designed by the authors of the study), encompassing questions concerning basic socio-demographic data, mood patterns, use of psychotropic medications or psychoactive substances, mental health services utilization, and family history of mental disorders.

The bipolarity features were assessed with the Hirschfeld Mood Disorder Questionnaire (MDQ) [9–11]. In accordance with the current standards for adults, the MDQ's diagnostic criterion was defined as ≥ 7 positive responses to the items referring to (hypo) manic symptoms (section 1 of the MDQ, consisting of 13 items), accompanied by both the co-occurrence of ≥ 2 of the hypomanic/manic symptoms (section 2) and the presence of moderate or serious problems caused by the symptoms (section 3) [12].

Depending on the normality of distribution, the statistical analysis employed the Student's t-test or the Mann-Whitney U test for the independent samples. The Chi² test

was used for the comparisons of qualitative variables [13–16]. The odds ratios (OR) were also calculated for consecutive variables.

Results

Socio-demographic profile

In the group 1 (ART) 22 men (38.6%) and 35 women (61.4%) were examined, while in the group 2 (TECH) data gathered from 38 men (60.3%) and 25 women (39.7%) were analysed. With regard to the gender ratio the difference between the groups was statistically significant ($p < 0.05$).

The mean age was 21.3 ± 1.8 years in the group 1 (ART), and 20.5 ± 1.2 years in the group 2 (TECH) ($p < 0.01$).

The correlations between age or gender and the MDQ scores were insignificant. Thus, the former variables do not seem to influence the basic results of the research.

The groups analysed did not differ in terms of the current year of the studies.

The occurrence of the bipolarity features in the groups studied.

The bipolarity features (as indicated by meeting the MDQ criteria) were significantly more prevalent in the ART group, as compared to the TECH cohort (28.2% vs. 4.8%; $p \leq 0.001$). Students of art faculties also scored higher on the first section of the MDQ (8.1 ± 2.7 pts. vs. 6.1 ± 2.8 pts.; $p \leq 0.0001$). The statistically significant ($p \leq 0.01$) OR value of 7.80 suggests that the chance of meeting the MDQ criteria was approximately eight-fold higher in the ART group, as compared to the TECH sample.

Subjective mood patterns in the groups studied

One of the items included in the catamnestic questionnaire concerned the subjective experience of elevated or depressed mood.

It was found that the experiences of ‘highs’ and ‘lows’ were significantly more frequent in the subjects enrolled in the ART cohort, as compared to the TECH sample (49.1% vs. 15.9%; $p \leq 0.0001$). The odds ratio value of 5.11 ($p \leq 0.001$) indicates that the mood swings were approximately five-fold more prevalent among the students of art faculties.

Various study faculties: the bipolarity spectrum features and the use of psychoactive substances

No statistically significant differences in the consumption of alcohol were observed between the groups. Cigarette smoking was significantly more prevalent in the ART group, as compared to the TECH sample (29.8% vs. 14.1%; $p < 0.05$), and the same held true for marijuana (52.6% vs. 32.8%; $p < 0.05$). The use of non-cannabinoid illicit drugs was also more widespread in the ART cohort (19.3% vs. 3.1%; $p < 0.01$). In addition, the odds ratio increased significantly in the group of students of art faculties: two-and

-a-half times for cigarette smoking, more than twice for marijuana consumption and almost seven-and-a-half times for the use of other substances (see Tab. 2).

Table 2. The use of the selected psychoactive substances in the students of arts and students of technology

VARIABLES (choice of 'yes')	ART (%)	TECH (%)	p	ODDS RATIO (OR) *p≤0.05, **p≤0.01, ***p≤0.001
Alcohol	64.3	67.2	NS	NS
Illicit drugs ¹	19.3	3.1	0.005	7.41 for 95% CI 1.56–35.07**
Marijuana	52.6	32.8	0.03	2.28 for 95% CI 1.08–4.75*
Cigarettes	29.8	14.1	0.04	2.60 for 95% CI 1.05–6.41*

¹ other than marijuana

Statistically significant results have been bolded

Measurements were also made for the frequencies of the above-mentioned variables in the 'bipolar' (MDQ+) and 'non-bipolar' (MDQ-) subjects. Parallel to the differences between the 'ART' and 'TECH' samples, significantly more widespread use of marijuana and non-cannabinoid drugs were observed in the MDQ+ cohort, as compared to the MDQ- group (marijuana: 63.2% vs. 36.8%, $p \leq 0.05$; other drugs: 26.3% vs. 7.9%, $p \leq 0.05$). Also, in the 'bipolar' sample the odds ratio for the use of marijuana increased approximately three-fold, and for the consumption of other substances – over four-fold (see Tab. 3).

Table 3. The use of the selected psychoactive substances in the MDQ positive and MDQ negative samples

VARIABLES (choice of 'yes')	MDQ			ODDS RATIO (OR) *p≤0.05, **p≤0.01, ***p≤0.001
	MDQ+ (%)	MDQ- (%)	p	
Alcohol	79	63	NS	NS
Illicit drugs ¹	26.3	7.9	0.02	4.15 for 95% CI 1.18–14.50*
Marijuana	63.2	36.8	0.05	2.73 for 95% CI 0.98–7.52*
Cigarettes	36.8	18.8	NS	NS

¹ other than marijuana

Statistically significant results have been bolded

The consumption of alcohol or tobacco was similar in both groups (see Tab. 3). The latter variable, however, appears to influence the mean scores in the section 1 of the MDQ, as smokers scored significantly higher, in comparison with the non-smokers (8.6±2.9 pts. vs. 6.6±2.8; $p < 0.01$). Similar relationship was observed in among the marijuana users and nonusers (7.8±3.1 pts. vs. 6.7±2.7 pts.; $p < 0.05$).

Various study faculties: the bipolarity spectrum features and the utilization of psychotropic medications, seeking for mental health support, and family history of mental disorders.

While we failed to find any significant differences between the populations studied in terms of the family history of mental disorders, it came out that the students of arts were more likely to use psychotropic medications (12.3% vs. 1.6%; $p \leq 0.05$), as well as to seek for mental health support (31% vs. 7.9%; $p \leq 0.001$) (see Tab. 4). In comparison with the students of technology, the odds ratio value for utilization of psychotropic medication was over eight-and-a-half fold higher in the ‘ART’ sample, and the odds ratio for seeking mental health professionals was more than five-fold higher in the latter group (see Tab. 4).

Table 4. **The summary of data on the consumption of psychotropic medications, seeking for mental health support, and family history of mental disorders among the students of arts and students of technology**

VARIABLES (choice of ‘yes’)	ART (%)	TECH (%)	p	ODDS RATIO (OR) * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$
Psychotropic medications	12.3	1.6	0.05	8.68 for 95% CI 1.03–72.90*
Support ¹	31	7.9	0.001	5.22 for 95% CI 1.79–15.21**
Family history ²	33.3	28.1	NS	NS

¹psychiatric or psychological

²a family history of mental disorders

Statistically significant results have been bolded

The above-mentioned variables were also analysed in the context of the MDQ scores.

Similarly to the findings concerning the ‘ART’ and ‘TECH’ samples, we concluded that the subjects exhibiting the bipolarity features (‘MDQ+’) were more likely to use psychotropic medications (31.6% vs. 3%; $p < 0.0001$), as well as to seek for mental health support (36.8% vs. 15.8%; $p < 0.05$) (see Tab. 5). Furthermore, the persons using psychotropic medications scored significantly higher on the section 1 of the MDQ, as compared to those who had denied using them (8.9 ± 2.3 pts. vs. 6.9 ± 2.9 pts.; $p < 0.05$). Equally important, the presence of bipolar spectrum features (as indicated by the MDQ scores) was indicating a fifteen-fold increase in the odds of using psychotropic medications, and over three-fold increase in the odds of searching for psychiatric or psychological treatment (see table 5).

No statistically significant difference was discerned with regard to the presence of mental disorders in the family between the ‘MDQ+’ and ‘MDQ-’ subjects (see Tab. 5 – next page).

Discussion

Our study indicates that the bipolarity features (as measured by the MDQ) are significantly more prevalent among the students of art faculties, as compared to their peers involved into technology. Also, ‘the artists’ seem to be more prone to experiencing mood swings (i.e. intermittent periods of elevated or depressed mood).

Table 5. The summary of data on the consumption of psychotropic medications, seeking for mental health support, and family history of mental disorders in the MDQ positive and MDQ negative groups

VARIABLES (choice of 'yes')	MDQ			ODDS RATIO (OR)
	MDQ+ (%)	MDQ- (%)	p	*p≤0.05, **p≤0.01, ***p≤0.001
Psychotropic medications	31.6	3	0.0000	15.08 for 95% CI 3.36–67.69***
Support ¹	36.8	15.8	0.03	3.10 for 95% CI 1.06–9.07*
Family history ²	31.6	30.7	NS	NS

¹ psychiatric or psychological

² a family history of mental disorders

Statistically significant results have been bolded

Furthermore, we found that the students of art faculties were more likely to use psychotropic medications or psychoactive substances (e.g. tobacco, marijuana or other illicit drugs), as well as to seek for mental health treatment. Similar tendencies were observed in the subjects exhibiting with the features of bipolarity. However, while scoring positively on the MDQ was linked to more frequent using of marijuana or other drugs, utilizing psychotropic medications, and seeking for psychological or psychiatric help, in our view the subjects 'nested within the bipolar spectrum' were not more likely to use tobacco than the 'MDQ-negative' participants of the study.

The existing research base into the co-occurrence of mood symptoms and various modalities of creativity is primarily concerned with the analysis and measurement of creative thinking abilities, and the associated bipolar features. Rybakowski et al. conducted an exhaustive review of evidence on this issue, and built a hypothesis suggesting that the processes of creativity may be indirectly related to the mood disorders (particularly to those of the bipolar nature). With reference to other authors, they also pointed out at some convincing evidence indicating a relationship between literary or artistic creativity, and affective disorders [17].

Of note, our study has been based on a presumption that some faculties are more closely related to creativity than others. Thus, we analysed only certain features exhibited by the students of arts or technology, rather than expressions of creativity themselves. It is also worth mentioning that we focused on the 'soft bipolar features' (as measured by the MDQ), instead of the clinical (full-blown) forms of BD. Nevertheless, the results remain in line with the above-mentioned direct evidence on the relationships between creativity and BD.

A growing body of data suggest that some temperamental and behavioural indicators may play a role as markers of bipolarity. If true, then mental health professionals should pay particular attention to the presence of such cues, and be willing to diagnose their patients accordingly [18]. In such a context, the data on a faculty chosen by a patient may play an additional role informing the diagnostic process. As pointed out by Akiskal, although a majority of subjects with bipolar II disorder do not seem to be

particularly creative, yet the outbreak of depression in an artist may be indicative of the latter illness, rather than major (unipolar) depression [19].

Finally, it needs to be recognized that the research set out in this paper has its limitations. The most important of them are the arbitrary assignments of the subjects into the samples of 'arts' or 'technology', and the indirect analysis of the individuals' creative capabilities.

Conclusions

A considerable prevalence of the bipolarity features (as measured by the Mood Disorder Questionnaire) in the students of arts, accompanied by the higher rates of mood swings, mental health service utilization, and the more widespread use of psychotropic medications or psychoactive substances indicate a significant association between artistic talents or creativity and the bipolar spectrum disorders.

Анализ черт двухполюсности среди студентов художественных учебных заведений и политехнических институтов

Содержание

Задание. Оценка частоты появления черт двухполюсности среди студентов различных направлений знаний с применением арбитражного разделения на художественные и политехнические институты.

Материал и метод. Обследовано 120 студентов, в том числе 57 студентов художественных и 63 политехнических институтов. В состав пособий, примененных в исследовании были: анкета, относящаяся к основным данным по социографии, а также Глоссарий нарушения настроения Хиршфельда (ГНН).

Результаты. Среди студентов художественных институтов черты двух-полюсного спектра, определенные при помощи ГНН появлялись существенно чаще в сравнение со студентами политехнических учебных заведений – то есть, соответственно 28,2% ср. 4,8%, $p \leq 0,001$; $OR = 7,8$; ЦИ 95%: 2,13–28,51; $p \leq 0,01$. Кроме того, студенты художественных направлений существенно чаще, нежели студенты политехнических институтов, приводили взор настроения в форме поочередных периодов настроения – „вверх – вниз” (49,1% ср. 15,9%, $p \leq 0,0001$, $OR = 5,11$, ЦИ 95%: 2,18–11,99, $p \leq 0,001$, а также чаще прибегали к помощи психиатра и /или психолога 12,3 ср 1,5%; $p \leq 0,05$; $OR = 5,2$; ЦИ 95%: 1,79–15,21; $p \leq 0,01$, а также чаще указывали на прием психотропных препаратов (31% ср. 7,9%, $p \leq 0,001$, $OR = 8,7$, ЦИ 95%: 1,03–72,9, $p \leq 0,05$) и использование психоактивных субстанций, иных чем алкоголь.

Выводы. Значительное присутствие черт двухполюсности, определенных при помощи Глоссария нарушений настроения, а также рост частоты периодов „вверх – вниз”, прибегание к помощи психиатров и психологов, применения психотропных лекарств и психоактивных субстанций студентами художественных институтов указывают на существенную связь между талантом и художественным творчеством и спектром двухполюсных нарушений.

Ключевые слова: креативность, спектр двухполюсных нарушений, двухполюсная аффективная болезнь

Analyse der Eigenschaften der Bipolarität unter Studenten der Kunsthochschulen und polytechnischen Hochschulen

Zusammenfassung

Ziel. Bewertung des Auftretens der Eigenschaften des bipolaren Spektrums unter den Studenten unterschiedlicher Studiengänge mit der Anwendung einer arbiträren Teilung in Kunststudiengänge und polytechnische Studiengänge.

Material und Methode. Es wurden 120 Studenten untersucht, darunter 57 Studenten der Kunsthochschulen und 63 Studenten der polytechnischen Hochschulen. Als Instrumente wurden eingesetzt: Umfrage zu soziodemographischen Angaben und Stimmung – Störung - Fragebogen von Hirschfeld (MDQ).

Ergebnisse. Unter den Studenten der Kunsthochschulen traten die Eigenschaften des bipolaren Spektrums, die mittels MDQ identifiziert wurden, signifikant häufiger auf im Vergleich mit den Studenten der polytechnischen Hochschulen (dementsprechend: 28,2% vs. 4,8%, $p \leq 0,001$; OR= 7,8; CI= 95%; 2,13-28,51; $p \leq 0,01$). Außerdem gaben die Studenten der Kunsthochschulen signifikant häufiger das Stimmungsmuster an als eine Reihe nacheinander folgenden Perioden der „Höhen und Tiefen“ (49,1% vs. 15,9%, $p \leq 0,0001$; OR=5,11; CI 95%; 2,18-1,99; $p \leq 0,001$) und häufiger suchten sie eine Beratung beim Psychiater oder Psychologen (12,3% vs. 1,5%; $p \leq 0,05$; OR = 5,2; CI 95%: 1,79-15,21; $p \leq 0,01$), sie nahmen auch häufiger psychotrope Mittel ein (31% vs. 7,9%, $p \leq 0,001$; OR=8,7; CI 95%; 1,03-72,9; $p \leq 0,05$) und mißbrauchten psychoaktive Substanzen andere als Alkohol.

Schlussfolgerungen. Eine große Verbreitung der bipolaren Eigenschaften, die mittels Stimmung – Störung – Fragebogen erfasst werden, und die immer häufigere Erfahrung von „Tiefen“ und „Höhen“, Hilfesuchen bei Psychologen oder Psychiatern, Einname von psychotropen Arzneimittel und der Mißbrauch von psychoaktiven Substanzen bei den Studenten der Kunsthochschulen weisen auf einen signifikanten Zusammenhang zwischen den Abhängigkeiten, der schöpferischen Arbeit und dem Spektrum der bipolaren Störungen hin.

Schlüsselwörter: Kreativität, Spektrum der bipolaren Störungen, affektive bipolare Krankheit

L'analyse des traits de la bipolarité des étudiants des écoles artistiques et polytechniques

Résumé

Objectif. Evaluer la prévalence du spectre bipolaire dans la population des étudiants des écoles artistiques et polytechniques (division arbitraire).

Matériel et Méthode. On examine 120 étudiants (57 - des écoles artistiques, 63 - des écoles polytechniques) avec le questionnaire sociodémographique et the Hirschfeld Mood Disorder Questionnaire (MDQ).

Résultats. Le spectre bipolaire est identifié plus souvent chez les étudiants des arts que chez ceux des écoles polytechniques, respectivement : 28,2% vs 4,8%, $p \leq 0,001$; OR = 7,8 ; CI 95% : 2,13 – 28,51 ; $p \leq 0,01$. De plus, les étudiants des arts plus souvent que ceux des écoles polytechniques : 1) déterminent le modèle de l'humeur comme les périodes successives des « hausses » et « des baisses » : 49,1% vs 15,9%, $p \leq 0,0001$; OR= 5,11 ; CI 95% : 2,18 – 1,99 ; $p \leq 0,001$; 2) plus souvent suivent la thérapie psychiatrique ou psychologique : 12,3% vs 1,5% ; $p \leq 0,05$; OR= 5,2 ; CI 95% : 1,79 – 15,21 ; $p \leq 0,01$; 3/ dans le passé ils déclarent plus souvent l'utilisation des psychotropes : 31% vs 7,9 % , $p \leq 0,001$; OR= 8,7 ; CI 95% : 1,03 – 72,9 ; $p \leq 0,05$. Ils déclarent aussi plus souvent l'usage des substances psychoactives (autres que l'alcool).

Conclusions. La prévalence considérable du spectre bipolaire (mesuré avec MDQ) combinée avec la grande prévalence des périodes des « hausses » et des « baisses », usage des psychotropes et des substances psychoactives, traitement psychiatriques ou psychologiques des étudiants des arts, tout cela indique l'association signifiante des talents artistiques, de la créativité et du spectre bipolaire.

Mots clés : créativité, spectre bipolaire, trouble bipolaire

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