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THE ROLE OF SENSATION SEEKING IN SUBSTANCE USE AND SPORTING AMONG FEMALE TEACHERS TRAINING COLLEGE STUDENTS**

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Sensation seeking is a personality trait characterized by the need for novelty, adventure, and a general willingness to take risks. Young adults are more likely to seek sensations in high-risk situations, such as shared substance use among friends, risky sexual behavior, or sports. We know even less about any link between behaviors that are not necessarily risky (e.g., hobby sporting, occasional drinking, etc.) and gender characteristics. This paper explored the role of different dimensions of sensation seeking in female college students' health behavior, including smoking, drinking, and active sporting. The sample consisted of female teachers training college students from Debrecen, Hungary (N = 171; mean age = 20.6, S.D. = 2.6 years). Binary logistic regression analyses revealed that the total score on the sensation seeking scale (BSSS-8) was related to all types of health behavior. Disinhibition (D) contributed to smoking and drinking, while other dimensions were also related to smoking. In addition, in active sporting Experience Seeking (ES) played a role. Focus on different dimensions of sensation seeking can be applied in health education programs, particularly for students (teacher training) whose health behavior may serve as an exemplar for children. As multiple analyses suggest, sport motivation can be elevated through satisfying the female students' experience seeking, while skills training in disinhibition may help to reduce their substance use.

Keywords: college students, sensation seeking, drinking, smoking, sporting

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1. Introduction

The social ecology of resilience concentrates on the role of social and physical ecologies playing a role in positive developmental outcomes when individuals encounter significant levels of stress (UNGAR 2011). Under stress, the individuals' environment is likely to account for more of the variance in developmental pathways. The developmental course depends on the degree of environmental facilitation providing resources, both in terms of risk and protection. In particular, protective processes have a dynamic nature depending on their specific developmental role. Curiosity and searching for novelties are specific characteristics of adolescence and young adulthood; therefore, their developmental role has some ambiguity for behavioral outcomes.

In the cultural context, gender (e.g., gender norms) plays an important role in young men's and women's health behaviors (FLEMMING & AGNEW-BRUNE 2015). Gender differences in health attitudes generally highlight a more concentrated health protective orientation among women compared to men. A study of medical students pointed out that female students smoked and used illicit drugs less frequently, while male students consumed more alcohol and drugs, particularly for novelty-seeking (FOND et al. 2018). Sports activity, on the other hand, is less frequent and declines after the early school years (SHERAR et al. 2007). However, gender-specific environment and cultural context may modify these tendencies: for example, researchers found poorer health status reported by individuals working in female-dominated job environments (CAROLI & WEBER-BAGHDIGUIAN 2016). All these findings suggest that we should know more about young people's risk and protective factors across gender groups.

Another relevant cultural issue is the way in which people perceive and react to risk-taking, particularly since the general cultural adaptation has evolved to the level of risk and novelty-seeking becoming the social norm in many cultures (ZUCKERMAN & NEEB 1980). It has always been a challenge in mental health promotion to determine psychological influences on health behavior. One of the key influences is an elevated level of risk-taking, particularly among young adults. Sensation seeking is a personality trait that is characterized by a need for novelties, adventures, and a willingness to take risks (ZUCKERMAN et al. 1978). It can be partitioned into four distinct dimensions: Thrill and Adventure Seeking (TAS), Experience Seeking (ES), Disinhibition (DIS), and Boredom Susceptibility (BS). From a physiological perspective, sensation seeking needs are the result of dopamine brain pathways, possibly engendering an increased interest in novelty and rewarding behavior (ZUCKERMAN 1994). This personality trait tends to reach a peak during late adolescence and early adulthood, that is, during a developmental stage when risk assessment skills are not fully developed (ROMER & HENNESSY 2007). Not surprisingly, it is closely related to another personality trait, namely impulsivity, and sensation seeking can be viewed as a by-product of impulsive behavior (WHITESIDE & LYNAM 2001). It is partly a learned reaction; however, due to an interplay of genetic and epigenetic effects, it can evolve into a personality trait (SEROCZYNSKI et al. 1999). Many studies are focused on the

negative consequences of impulsivity, such as problem behavior, a greater level of aggressiveness, and/or depressive symptomatology (GULLO & DAWE 2008). Increased risk-taking stems from neurodevelopmental processes, namely a greater emotional reactivity and lack of emotion regulation during adolescence and young adulthood. Explicitly, there is a discrepancy between developmental phases of subcortical limbic regions and the prefrontal cortex (cortical control regions) that may result in more emotional elements in decision making (CASSEY et al. 2008).

On the other hand, impulsivity and sensation seeking has a substantial evolutionary advantage for adaptation to new situations, and even in modern life, it may help adapting to the challenges during adolescence and young adulthood, to the increased possibilities, autonomy, and the development of a new identity (GREENE et al. 2000). In addition, these personality traits are in close connection with spontaneity and creativity (KIPPER et al. 2010). Therefore, despite the potential for them to develop into problem behavior, it may also be true that they contribute to healthy adaptation during development. However, more research is needed to investigate this double-edged personality trait.

Previous work suggests that due to these developmental processes, young adults are more likely to seek sensations in high risk situations, such as shared substance use among friends, engage in risky sexual behavior or participate in sports (BARETTA et al. 2017; CHARNIGO et al. 2013; HOYLE et al. 2002; NELSON et al. 2002). Moreover, sensation seeking may have a motivating role in binge drinking and young adults' sport participation, which often work in conjunction with one another (DRANE et al. 2017). On the other hand, as previous work suggests, certain sports can prevent young adults' problem behavior since sensation seeking can be an important correlate of both positive and negative risk behavior (HANSEN & BREIVIK 2001). Since there are not only biochemical similarities in these health-related behaviors but also differences, it would be important to detect which dimensions of sensation seeking play what type of role in each type of behavior.

Studies typically report correlations between sensation seeking and alcohol use, including binge and problem drinking (STEPHENSON et al. 2007). In a sample of French college students, Disinhibition showed a positive correlation with blood alcohol concentration, both in men and women (LEGRAND et al. 2007). In reviews on the relationship between impulsivity/sensation seeking and alcohol use, sensation seeking and urgency (a dimension of impulsivity) showed the largest correlation (HITTNER & SWICKERT 2006; STAUTZ & COOPER 2013). Besides drinking, smoking is also correlated with sensation seeking (URBÁN 2010; STEPHENSON et al. 2007). As ZUCKERMAN and NEEB (1980) pointed out, smokers had higher scores than non-smokers, although the relationship with the amount of smoking was not a linear one. In a study of adolescents, Disinhibition and Thrill and Adventure Seeking were related to both cigarette and marijuana use (KOPSTEIN et al. 2001). In French adults, smokers of both sexes were generally scoring higher in sensation seeking than nonsmokers, including Disinhibition, Experience Seeking, and Boredom Susceptibility; smoking women scored higher, particularly in Experience Seeking compared to men (CARTON et al. 1994).

While several studies report a relationship between sensation seeking needs and sporting behavior, most of them focus on high-risk sports (ZUCKERMAN 1983). A study of American university students compared athletes to nonathletes and found that male athletes scored higher on sensation seeking than male nonathletes, and female athletes had higher sensation seeking needs than female nonathletes (SCHROTH 1995). Another study of university students revealed that sensation seeking was a predictor of sport interest in certain instances (e.g., gymnastics, football) depending on the type of sports. Namely, regarding Thrill and Adventure Seeking and Boredom Susceptibility, females were more likely to engage in this behavior compared to males; Experience Seeking and Disinhibition was typically associated more with competitive than non-competitive sports (FRANKEN et al. 1994). While most studies measured differences in the scores of sensation seeking scales between athletes/nonathletes or physical education majors/college normative groups or high-risk/low risk athletes (JACK & RONAN 1998), we know much less about the role of sensation seeking in sporting behavior among nonathletes.

In this paper, we focused primarily on the role of sensation seeking in health behavior of teachers training college students. Due to a huge surplus of females in this school type, we used a sample of only female college students. We believe this relationship is important for several reasons. First, college students have a greater freedom but also a greater control over their lifestyles than ever before (VON AH et al. 2004). Second, due to these attitudes and academic workload as well as responsibilities, they often engage in risky health behavior, including substance use, physical inactivity, unsafe sex, and unhealthy diets (ADAMS & MOORE 2007). Since our sample consists of prospective teachers (particularly female teachers), that is, potential role models for children, their health related attitudes and behaviors should be exemplary. Finally, although life expectancy is improving while mortality rates – as well as harmful habits such as smoking and drinking – show a declining tendency in Hungary, inactive lifestyle and chronic diseases (such as cancer or cardiovascular) are still among the highest in Hungary compared to the European average (KOVÁCS & TÓTH 2015). Finally, there is a shortage of studies on college and university populations in Hungary. In a previous study, the prevalence of smoking was 27.5% among female medical students (PIKÓ 2008). Another study found that approximately 40% of teachers training college students were smokers (VERES-BALAJTI et al. 2013).

Therefore, the main goal of the paper was to explore the role of sensation seeking in female college students' smoking, drinking, and active sporting behavior. More precisely, we aimed to detect the role of different dimensions of sensation seeking. Thus, after descriptive statistics (frequencies of each health behavior item), we aimed to calculate Odds Ratios to test the contribution of the sensation seeking scale and its subscales to specific health behaviors. We also calculated Odds Ratios for socio-demographics to assess whether they might play some role in predicting health behavior odds. Health education programs should consider applying different aspects of sensation seeking in targeting each type of health behavior observed in students.

2. Method

2.1. Sample and procedure

Data were collected from teacher training college students ($N = 171$) during the second semester of the 2015/2016 class year at the University of Debrecen, a major institution of higher education in Hungary. Participants were all female; 46.4 percent prospective primary school teachers and 53.6 percent nursery school teachers; the sampled students had a mean age of 20.6 years with a S.D. = 2.6 years. The original sample size of the survey was 179, however, we removed all the male students ($n = 8$) to avoid any evaluation bias. The students were informed about the research goals and their informed consent was obtained. Questionnaires were self-administered, anonymous, and voluntary.

2.2. Measures

The survey instrument contained sociodemographics (age, father's and mother's schooling and SES self-assessment), frequency of substance use (smoking, drinking, binge drinking) and questions related to active sporting (in each case a three-month prevalence). For the purposes of the current study, we dichotomized the prevalence variables regardless of the frequency of each behavior, so these variables (yes/no) represented the actual substance using/active sporting status of each student.

Sensation seeking was measured with the eight-item Brief Sensation Seeking Scale, BSSS-8 (HOYLE et al. 2002), which was created by adapting items from the SSS-V (ZUCKERMAN et al. 1978). We specifically used the Hungarian validated version for the current study (MAYER et al. 2012). The instrument contains four subscales (each with two items): Experience Seeking (ES), Thrill and Adventure Seeking (TAS), Disinhibition (DIS) and Boredom Susceptibility (BS). Responses were evaluated on a five-point Likert-type scale labeled as 'strongly disagree', 'disagree', 'neither disagree nor agree', 'agree' and 'strongly agree'. The computed alpha for reliability with the current sample was 0.77 (BSSS-8) and those for the subsamples ranged from 0.55 – 0.76.

After descriptive statistics (frequencies of each health behavior item and t-tests for detecting differences in the means of sensation seeking scales by health behavior), logistic regression analyses were applied in which health behaviors were the dependent variables, and sensation seeking behaviors were the independent ones. A similar logistic regression was calculated for the relationship between health behaviors and sociodemographics (age, father's and mother's schooling and SES self-assessment). Finally, multiple logistic regressions were applied to detect the most determinant contributors.

3. Results

Table 1 provides descriptive statistics. In the sample, 81.9 percent reported alcohol use during the past three months and 56.7 percent reported binge drinking; the three-month prevalence of smoking was 38.6 percent and 40.0 percent of them were engaged in active sporting. Due to possible imbalance in frequencies, instead of one-month, we used the three-month prevalence of these health behavior items.

Table 1
Three-month prevalence of substance use and active sporting among college students (N = 171)

	n (%)
<i>Smoking</i>	
No	105 (61.4%)
Yes	66 (38.6)
<i>Alcohol use</i>	
No	31 (18.1%)
Yes	140 (81.9%)
<i>Binge drinking</i>	
No	74 (43.3%)
Yes	97 (56.7%)
<i>Active sporting</i>	
No	102 (60.0%)
Yes	68 (40.0%)

We also performed student t-tests to compare means of the sensation seeking scales across sociodemographic groups. Significant differences were detected in two cases. First, students whose father had a minimum college degree scored higher on Experience Seeking ($t_{167} = -1.985, p < 0.05$) compared to students whose father did not have college degree. In addition, students scored higher on the Thrill and Adventure Seeking (TAS) scale when their mother did not have a higher education degree ($t_{167} = 1.928, p < 0.05$) compared to students whose mother did have a degree. The relationships between age and the sensation seeking scales were analyzed via correlations and we found only one significant result with ES (Experience Seeking): $r = -0.20, p < 0.01$.

Table 2 presents binary logistic regression results for the relationship between substance use and active sporting (as dependent variables) and sensation seeking subscales (as independent ones). Odds Ratios (OR) were reported with 95% Confidence Intervals besides p values for significance.

Table 2
Binary logistic regression of the relationship between sensation seeking and college students' health behavior (N = 171)

	OR	(95% CI)
<i>Smoking</i>		
ES (<i>Experience seeking</i>)	1.51	(1.04 – 2.04)**
TAS (<i>Thrill & adventure seeking</i>)	1.23	(1.03 – 1.48)*
DIS (<i>Disinhibition</i>)	1.67	(1.30 – 2.16)***
BS (<i>Boredom susceptibility</i>)	1.34	(1.06 – 1.70)*
BSSS (<i>Total</i>)	1.13	(1.05 – 1.20)***
<i>Alcohol use</i>		
ES (<i>Experience seeking</i>)	0.93	(0.65 – 1.31)
TAS (<i>Thrill & adventure seeking</i>)	1.06	(0.85 – 1.33)
DIS (<i>Disinhibition</i>)	1.86	(1.37 – 2.53)***
BS (<i>Boredom susceptibility</i>)	1.40	(1.04 – 1.89)*
BSSS (<i>Total</i>)	1.08	(1.01 – 1.17)*
<i>Binge drinking</i>		
ES (<i>Experience seeking</i>)	1.10	(0.84 – 1.43)
TAS (<i>Thrill & adventure seeking</i>)	1.08	(0.91 – 1.28)
DIS (<i>Disinhibition</i>)	2.03	(1.55 – 2.64)***
BS (<i>Boredom susceptibility</i>)	1.27	(1.01 – 1.60)*
BSSS (<i>Total</i>)	1.10	(1.03 – 1.17)**
<i>Active sporting</i>		
ES (<i>Experience seeking</i>)	1.61	(1.18 – 2.20)**
TAS (<i>Thrill & adventure seeking</i>)	1.20	(0.99 – 1.43)
DIS (<i>Disinhibition</i>)	1.11	(0.89 – 1.38)
BS (<i>Boredom susceptibility</i>)	1.22	(0.97 – 1.53)
BSSS (<i>Total</i>)	1.09	(1.02 – 1.16)**

OR = Odds Ratio 95% CI = 95% Confidence Intervals

*: $p < 0.05$ ** : $p < 0.01$ ***: $p < 0.001$

Besides the total score of the BSSS-8, all subscales predicted smoking. Among the subscales, Disinhibition proved to be the strongest predictor (OR = 1.67; 95% CI = 1.30 – 2.16; $p < 0.001$). In drinking, including binge drinking, Disinhibition played a decisive role. In addition, Boredom Susceptibility was also a significant contributor. Active sporting presented a different picture—while the total score of the BSSS-8 was a significant predictor, similar to smoking and drinking, among the subscales,

Experience Seeking was the only significant contributor (OR = 1.61; 95% CI = 1.18 – 2.20; $p < 0.001$).

Table 3 shows results for logistic regression analyses using sociodemographics. Only one significant result was identified: smoking was less common among those who reported belonging to upper or upper-middle classes compared to lower, lower-middle or middle classes (OR = 0.39; 95% CI = 0.15 – 0.96, $p < 0.05$).

Table 3
Binary logistic regression of the relationship between sociodemographics
and college students' health behavior (N = 171)

	OR	(95% CI)
<i>Smoking</i>		
Age	0.77	(0.86 – 1.12)
SES self-assessment (1 = lower 2 = upper)	0.39	(0.15 – 0.96)*
Mother's schooling (1 = max. high school 2 = min. college)	0.63	(0.32 – 1.21)
Father's schooling (1 = max. high school 2 = min. college)	0.52	(0.22 – 1.23)
<i>Alcohol use</i>		
Age	0.93	(0.81 – 1.06)
SES self-assessment (1 = lower 2 = upper)	0.54	(0.19 – 1.52)
Mother's schooling (1 = max. high school 2 = min. college)	0.46	(0.18 – 1.20)
Father's schooling (1 = max. high school 2 = min. college)	0.34	(0.08 – 1.55)
<i>Binge drinking</i>		
Age	0.99	(0.88 – 1.12)
SES self-assessment (1 = lower 2 = upper)	1.13	(0.45 – 2.81)
Mother's schooling (1 = max. high school 2 = min. college)	0.61	(0.31 – 1.19)
Father's schooling (1 = max. high school 2 = min. college)	0.86	(0.36 – 2.04)
<i>Active sporting</i>		
Age	0.71	(1.02 – 1.16)
SES self-assessment (1 = lower 2 = upper)	0.85	(0.34 – 2.16)
Mother's schooling (1 = max. high school 2 = min. college)	1.46	(0.76 – 2.81)
Father's schooling (1 = max. high school 2 = min. college)	1.02	(0.43 – 2.44)

OR = Odds Ratio 95% CI = 95% Confidence Intervals

*: $p < 0.05$ ** : $p < 0.01$ ***: $p < 0.001$

Finally, Table 4 presents results for multiple regression analyses including both SSS subscales and sociodemographics. In terms of risky health behaviors, disinhibition played a decisive role, whereas in the case of active sporting, experience seeking was a predictor. None of the sociodemographics proved to significantly contribute to any one of the health behaviors. The inferential goodness-of-fit tests, that is, the Hosmer–Lemeshow (H–L) tests, were insignificant ($p > .05$) in each model, suggesting that the model fits the data well (PENG et al. 2002).

Table 4
Multiple logistic regression of the relationship between sensation seeking and sociodemographics, and college students' health behavior (N = 171)

	OR	(95% CI)
<i>Smoking</i>		
Age	0.96	(0.80 – 1.16)
SES self-assessment (1 = lower 2 = upper)	0.36	(0.13 – 1.03)
Mother's schooling (1 = max. high school 2 = min. college)	1.08	(0.36 – 3.23)
Father's schooling (1 = max. high school 2 = min. college)	0.68	(0.30 – 1.55)
ES (Experience seeking)	1.25	(0.87 – 1.80)
TAS (Thrill & adventure seeking)	1.00	(0.78 – 1.29)
DIS (Disinhibition)	1.61	(1.18 – 2.20)**
BS (Boredom susceptibility)	1.09	(0.83 – 1.44)
<i>Alcohol use</i>		
Age	0.86	(0.71 – 1.05)
SES self-assessment (1 = lower 2 = upper)	0.36	(0.09 – 1.46)
Mother's schooling (1 = max. high school 2 = min. college)	0.13	(0.01 – 1.32)
Father's schooling (1 = max. high school 2 = min. college)	0.63	(0.19 – 2.09)
ES (Experience seeking)	0.60	(0.36 – 1.00)*
TAS (Thrill & adventure seeking)	0.89	(0.64 – 1.23)
DIS (Disinhibition)	2.25	(1.51 – 3.36)***
BS (Boredom susceptibility)	1.11	(0.09 – 1.46)
<i>Binge drinking</i>		
Age	0.94	(0.79 – 1.12)
SES self-assessment (1 = lower 2 = upper)	1.11	(0.36 – 3.44)
Mother's schooling (1 = max. high school 2 = min. college)	1.00	(0.32 – 3.14)
Father's schooling (1 = max. high school 2 = min. college)	0.72	(0.30 – 1.73)
ES (Experience seeking)	0.87	(0.61 – 1.25)
TAS (Thrill & adventure seeking)	0.80	(0.62 – 1.04)
DIS (Disinhibition)	2.52	(1.79 – 3.54)***
BS (Boredom susceptibility)	1.02	(0.76 – 1.35)
<i>Active sporting</i>		
Age	1.09	(0.96 – 1.26)
SES self-assessment (1 = lower 2 = upper)	0.97	(0.35 – 2.78)
Mother's schooling (1 = max. high school 2 = min. college)	1.87	(0.63 – 5.49)
Father's schooling (1 = max. high school 2 = min. college)	0.50	(0.22 – 1.11)
ES (Experience seeking)	1.74	(1.20 – 2.53)**
TAS (Thrill & adventure seeking)	1.07	(0.85 – 1.37)
DIS (Disinhibition)	0.86	(0.65 – 1.14)
BS (Boredom susceptibility)	1.20	(0.92 – 1.58)

OR = Odds Ratio 95% CI = 95% Confidence Intervals

*: $p < 0.05$ ** : $p < 0.01$ *** $p < 0.001$

4. Discussion

In this paper, we examined the role of sensation seeking in health behavior among female teachers training college students. More precisely, we examined how substance using and active sporting status were related to the total score as well as each dimension of sensation seeking. Previous studies suggested correlations with these health-related variables (e.g., BARETTA et al. 2017; HOYLE et al. 2002; JACK & RONAN 1998; STEPHENSON et al. 2007) and our results supported these relationships. The total score of BSSS-8 predicted not only smoking, drinking, and binge drinking but also active sporting among the sampled college females.

While the link between sensation seeking and risky behavior is evident (ROBERTI 2004), we know less about this link to behaviors other than risky ones (e.g., hobby sporting, occasional drinking, etc.). In addition, we know little about the role of each dimension, since the concept of sensation seeking describes four distinct dimensions: Thrill and Adventure Seeking, Experience Seeking, Disinhibition, and Boredom Susceptibility (ZUCKERMAN 1994). Some studies have argued over their precise role and regarding their contribution to different health behaviors (CARTON et al. 1994; FRANKEN et al. 1994; KOPSTEIN et al. 2001; LEGRAND et al. 2007). Our study supports the previous results regarding the role of Disinhibition in alcohol use (LEGRAND et al. 2007). Likewise, this dimension of sensation seeking was the strongest predictor of smoking, where other dimensions were also significant – similar to previous reported results (CARTON et al. 1994; KOPSTEIN et al. 2001). As compared to smoking and drinking, we know less about the role of these dimensions in sporting among nonathletes; e.g., average college students. We found that Experience Seeking played a role in determining female college students' active sporting. This is particularly important since a previous study found that girls were higher on new experience seeking compared to boys who were higher on Thrill and Adventure Seeking (HANSEN & BREIVIK 2001).

The multiple analysis supports the findings that whereas in risky health behaviors disinhibition plays a decisive role, in active sporting experience seeking is the determinant. Thus the role of sensation seeking in health behavior is depending on the nature of health behavior.

While this particular work makes an important set of contributions to our understanding of the relationships between sensation seeking and health behaviors, we note some important limitations to this study. The sample consisted of female students only (which resulted from the college's specific gender distribution). Because of the preliminary nature of the study, we need a larger sample size (to be completed with male students) with a more elaborated concept (e.g., including impulsivity) and a more detailed picture of young people's health behavior (instead of prevalence data, frequencies, amount, etc.). Other types of health behavior may also be included, such as dietary habits.

Finally, these results have the potential for important applications in health education programs for college students, particularly those from teachers training college

students whose health behavior may serve as an exemplar for children. Our results suggest that 60 percent of the sample were inactive, 38.6 percent were smokers, more than 80 percent drank alcohol and, 56.7 percent reported binge drinking. For students who are on track to teach in primary and secondary schools, these are not the type of findings that are particularly favorable. This period of time in the students' life is perhaps one of the last opportunities to influence their health consciousness before they start on their career as educators. Satisfying the students' experience seeking can enhance their sport motivation, while skills training in disinhibition can help reduce their substance use. These findings also support the controversial role of sensation seeking in developmental processes during adolescence and young adulthood (CASSEY et al. 2008; GREENE et al. 2000; KIPPER et al. 2010). More research is needed to understand the complexity of sensation seeking and its impact. In general, sensation seeking is a complex concept and while it has the potential to encourage students to engage in risky behaviors, in other cases it can also be viewed as a motivator to engage in (non-competitive) sports. Thus, we can build health education programs on the positive side of sensation seeking as well as being concerned with its possible negative impacts on young adults.

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