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Binge drinking in 14-year-old Italian students is correlated with low or high psychological well-being: a cross-sectional study

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Balanced levels of Psychological Well-Being (PWB) can represent protective factors for human functioning. PWB has not been investigated among young adolescents who practice binge drinking (BD), a popular pattern of alcohol intake, defined as the consumption of 5 or more alcoholic units in one session. The negative impact of BD on psychophysical health has been extensively studied, but there is scarcity of studies investigating the influence of psychological variables on BD in early adolescence. The main aim of this study was to fill the gap in the literature, focusing on PWB as a new possible target of preventive interventions. 1687 Italian adolescents completed questionnaires assessing BD, cannabis use, lifestyle, allostatic overload, subclinical psychological distress, problem-solving and PWB. Binge drinkers represented 9% of the sample. Among them, 71%, 26% and 3% binge drank monthly, weekly, and daily, respectively. Stress (higher frequency of stressful life events), psychological distress (higher hostility) and PWB dimensions (higher scores on positive relations and lower on purpose in life) were associated with BD. These new findings on unbalanced levels of PWB could represent the potential target of longitudinal studies aimed to implement specific preventive interventions among young adolescents. Implications for research and prevention are discussed.

Keywords: alcohol; binge drinking; early adolescence; Italian adolescents; psychological distress; psychological well-being.

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Introduction

Alcohol represents the most used and socially accepted legal drug in the world (Plant & Plant, 2006). At the same time, this toxic and psychoactive substance contributes to 3 million deaths each year worldwide (World Health Organization, 2018) and accounts for high welfare-related costs and societal burden (Thavorncharoensap et al., 2009; Lim et al., 2012). On one hand, indeed, consuming alcohol is seen as a pleasure activity. People usually drink in moderation without harmful effects (Plant & Plant, 2006; Staddon, 2015), enjoying positive psychophysical and social benefits (Peele & Brodsky, 2000), so that - paradoxically - in societies in which drinking alcohol is the norm, being abstainers is associated with depression and anxiety (Skogen et al., 2009). Furthermore, especially among adolescents, alcohol represents a ‘social lubricant’ with positive connotations that characterize people as sociable, sexy, ‘cool’ and mature (Plant & Plant, 2006; Martinic & Measham, 2008). On the other hand, since alcohol is the most common addictive substance, moderate drinking **may** lead to problematic drinking (Manolis et al., 2019). In excess, alcohol consumption may affect the pre-frontal cortex bringing to greater disinhibition effects and, in turn, increasing risk-taking behaviors (Brooks et al., 2019).

In Mediterranean countries, the habit of drinking alcohol was typically moderate and part of the daily diet (‘wet’ culture), whereas in North European and North American countries, alcohol consumption was usually episodic and excessive (‘dry’ culture) (Room, 2010; Graziano et al., 2012; Petrilli et al., 2014; Biolcati et al., 2016; Contel & Scalvedi, 2016; Alessandrini et al., 2018). In recent years, however, the distinction between ‘wet’ and ‘dry’ cultures is disappearing (Katainen & Rolando, 2015). Indeed, in Mediterranean countries (including Italy), wine consumption is decreasing whereas the habit of drinking beer and spirits on an empty stomach, especially on weekends, is

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increasing (Bräker & Soellner, 2016; Alessandrini et al., 2018). At the same time, the number of adolescents and young adults who consume episodically excessive amounts of alcohol to experience its psychotropic effects (Alessandrini et al., 2018) is rising. Binge drinking (BD), a characteristic pattern of alcohol intake, is becoming widespread among Italians (D'Alessio et al., 2006; Graziano et al., 2012). This term indicates an exaggerated alcohol use (Plant & Plant, 2006) and it connotes a single, heavy alcohol session that brings on an altered state, from being 'tipsy' (Beccaria et al., 2015) to intoxicated (Plant & Plant, 2006). Specifically, BD is defined by the consumption of 5 or more alcoholic beverages on the same occasion (Glassman et al., 2010), usually on weekends (Kuntsche et al., 2017). BD involves 35% of European adolescents (34% in Italy) (European School Survey Project on Alcohol and Other Drugs [ESPAD] Group, 2015). These data underline the importance of this topic, which has been included among the pillars of international research programs, such as Horizon 2020, which represents the most important research and innovation program in Europe.

Among young people, BD is socially approved and respected, with its pleasure and pain (Plant & Plant, 2006; Martinic & Measham, 2008). Despite its positive value, indeed, BD brings to a large number of negative health and psychosocial outcomes. Health issues include poor sleep quality (Ehlers et al., 2018), neuropsychological performance (Carbia et al., 2017), and sexually transmitted diseases (Kuntsche et al., 2017). The psychosocial impact involves car accidents (Kuntsche et al., 2017), injuries as a result of fights (Zimmermann et al., 2007), unwanted pregnancies (Naimi et al., 2003), troubles with the law, parents and peers (Zimmermann et al. 2007), and suicide attempts (White et al., 2015). Both governments and media seem to play a key role in exaggerating and sensationalizing BD, generating 'moral panic' and also confusion about the definition of the phenomenon and its resolution (Plant & Plant, 2006).

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Therefore, it is deemed necessary to disseminate scientific evidence in order to reduce the gap between the literature, political and public knowledge (Plant & Plant, 2006). Adolescents are particularly vulnerable to risk-taking behaviors because of the incomplete development of the cortical areas responsible for self-regulation (Tăut et al., 2015). In addition, the transition from middle to high school, which takes place at the age of 13-14 years old in Italy, constitutes a source of stress among students (Gatta et al., 2012). Indeed, new stressors due to the biological and psychosocial changes show up in the lives of these young adolescents, who do not have fully matured appropriate coping strategies yet (Bonino et al., 2007; Palmonari, 2011). In turn, higher perceived stress (Chen & Feeley, 2015) is a risk factor of heavy drinking and BD, since it could be intended as a dysfunctional problem-solving strategy to deal with stress, as found in high school and college students (Jaffee & D’Zurilla 2003; Ramadan & McMurrin, 2005; Metzger et al., 2017).

From the psychological point of view, there is scarcity of Italian studies evaluating psychological characteristics of adolescent binge drinkers (BDers), especially among fourteen-year-olds (Guzzo et al., 2013; Innamorati & Maniglio, 2015; Addolorato et al., 2018; Biolcati et al., 2018).

Regarding to well-being, the hedonic approach considers subjective well-being in terms of pleasure attainment, pain avoidance, and life satisfaction (Kahneman et al., 1999), whereas the eudaimonic point of view concerns human positive functioning and self-realization in life (Ryan & Deci, 2001). According to this approach, Psychological Well-Being (PWB) (Ryff, 1989) does not embody happiness merely, but represents the condition of human flourishing and ‘the realization of one’s true potential’ (Ryff, 1995, p. 100). The PWB Ryff and Singer’s theory of eudaimonia has been conceptualized into a model, which entails six dimensions of human functioning: self-acceptance;

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autonomy; positive relations; environmental mastery; personal growth; purpose in life (Ryff & Singer, 1998). Unbalanced levels of PWB are associated with impaired functioning (Fredrickson & Losada, 2005; Ruini & Fava 2012, 2014). A recent study (Rafanelli et al., 2016) showed that late adolescent **BDers** displayed poorer levels of environmental mastery and higher levels of autonomy and positive relations than their peers who did not binge drink. Accordingly, **BDers** seem to have difficulties seizing opportunities and overcoming daily life requests (low environmental mastery) (Fava & Ruini, 2014); asking for help and advice, being too independent and autonomous (high autonomy) (Fava & Ruini, 2014); being overwhelmed by others' issues, and giving priority to others' needs (high positive relations) (Fava & Ruini, 2014). In addition, given that the presence of good levels of PWB plays an important protective role in response to life stress situations (Ryff & Singer, 1996), in terms of **less** engagement in risky behaviors (Schwartz et al., 2011), these aspects could pave the way for future innovative interventions. Despite this, unbalanced PWB has not yet been investigated as a potential risk factor associated with BD among young adolescents.

Finally, although gender differences in BD incidence among young adolescents are not reported (Evans-Polce et al., 2015), specific psychological variables have been found to be associated with BD in females (i.e. stress, depression, internalizing behaviors) and males (i.e. behavioral disinhibition, impulsivity, sensation seeking) (Hartley et al., 2004; López-Caneda et al., 2019), in addition to the knowledge that females are more vulnerable than males to the psychotropic effects of alcohol (Dir et al., 2017; Vinader-Caerols et al., 2017) due to psychophysical differences (Schuler et al., 2015; Dir et al., 2017). In line with these results, men and women have been found to display different drinking patterns. Indeed, the female pattern of alcohol consumption does not represent a replication of male style (Blackman et al., 2015; Measham & Østergaard, 2009), as -

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usually - women are more prone to achieve pleasure by drinking alcohol without getting too drunk, thus maintaining their femininity (Blackman et al., 2015). To the best of our knowledge, no study evaluated gender differences concerning unbalanced levels of PWB and BD.

The aims of the present study were 1) to describe the BD phenomenon at its early onset in Italian young adolescents, in terms of sociodemographic characteristics (gender, type of high school, academic performance) and lifestyle (diet, physical activity, multi-substance abuse, drinking motives and situations); 2) to compare adolescents who binge drink with different frequency (monthly BD, weekly BD, daily or almost daily BD) on sociodemographic, lifestyle and psychological variables; 3) to identify psychological variables (i.e., stress, distress, problem-solving skills, and psychological well-being) associated with BD, focusing on PWB as a new possible target of preventive interventions. Since previous studies with different targets (i.e., older populations) highlighted differences between males and females in the associations of BD with some psychological variables, we examined gender differences as well.

Methods

Sample

The sample consisted of 1687 young adolescents (M=53.2%; mean age=14.24±0.624 years old) attending the first year of nineteen high schools in North/Centre (Emilia Romagna and Marche) and South Italy (Molise). 667 students (39.5%) were enrolled in scientific, classic, artistic and human sciences high schools, whereas 1020 (60.5%) in technical and professional institutes. In Italy, high schools last five years and are divided into high schools specialized in basic subjects (humanities, science, and arts), technical and professional institutes, which focus on specific fields and work-related

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studies (i.e., tourism, economy, and technology).

The local Institutional Review Board examined and approved the study protocol.

Participation was preceded by an informed-consent procedure that required signed consent from parents. An anonymous questionnaire was given to all the students who were in the classroom during the day of the questionnaires administration. The enrollment procedure was conducted during the 2016-2017 school year. None of the students refused to complete the survey.

Assessment

A self-report questionnaire including specific questions on sociodemographic data, lifestyle and psychological characteristics was utilized. Sociodemographic information included gender, types of high school attended and grade point average. Questions on lifestyle assessed sport and physical activity, diet, alcohol, tobacco, cannabis, and other drug consumption, favorite alcoholic drink, first use and current drinking motives, and situations related to alcohol consumption. To evaluate alcohol consumption and - in particular - BD, Alcohol Use Disorder Identification Test- C (AUDIT-C) (Rumpf et al., 2013), which represents a shortened version of the AUDIT (Saunders et al., 1993), has been used. It consists of three items with answers on a 5-point Likert scale. The third item ('How often do you have six or more drinks on one occasion?') has been modified in 'How often do you have five or more drinks on one occasion?' (*never; less than monthly; monthly; weekly; daily or almost daily*) to establish the presence of BD, as defined by ESPAD reports criteria [i.e., 'How many times (if any) have you had five or more drinks in a row? A drink is a glass of wine (approximately 15 centiliters), a bottle or can of beer (approximately 50 centiliters), a shot glass of spirits (approximately 5 centiliters) or a mixed drink.'](ESPAD Group, 2015). The cut-off of 5 or more drinks brings a person's blood alcohol concentration to 0.08 grams percent or above and this is

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chosen because of its functional impact on the drinker (Fillmore & Jude, 2011). If the participant gave an answer from *monthly* to *daily* or *almost daily*, then he/she was classified as a binge drinker. This phenomenon has been also differentiated in monthly BD, weekly BD or daily BD based on **its** frequency. To assess cannabis consumption, items from the Cannabis Experience Questionnaire (Di Forti et al., 2009) have been selected.

In addition, the assessment included other validated psychological questionnaires. Symptom Questionnaire (SQ) (Kellner, 1987; Benasi et al., 2020) is a 92-item self-rating scale that evaluates psychological subclinical distress. SQ includes 4 scales (anxiety, depression, somatization, and hostility-anger) and items have a dichotomous scale (*Yes/No* or *True/False*). Each of the 4 scales yields a total score (ranging from 0 to 23) given by the sum of the related items. Higher scores indicate higher psychological distress in the related scale. **SQ showed Cronbach α coefficients ranged from .74 (hostility scale) to .34 (somatization scale) (Vescovelli et al., 2014).**

PsychoSocial Index (Sonino & Fava, 1998; Piolanti et al., 2016) is a 53-item self-rating questionnaire. Participants have to respond on a dichotomous scale (*Yes/No*) to some items and on a Likert scale ranging from *not at all* = 0 to *a great deal* = 3 to others. PsychoSocial Index has been used for the assessment of stressful events, life satisfaction, and allostatic overload. The operationalization of allostatic overload is based on specific clinimetric criteria developed by Fava and colleagues (2010). Criterion A requires the presence of an identifiable stressor that must be judged as exceeding or taxing the individual's coping skills. Criterion B requires the stressor to be associated with at least one manifestation among psychiatric or psychosomatic symptoms, impaired functioning, or compromised well-being. **The PsychoSocial Index showed intraclass correlation coefficients ranging from 0.94 to 0.80 (Sonino & Fava,**

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1998).

Problem Solving Inventory, Form B (PSI-Form B) (Heppner, 1998) is a self-rating questionnaire used to measure self-awareness, evaluation of one's own problem-solving abilities and type of problem solving. It consists of 35 items on 6-point Likert scale ranging from *strongly agree* = 1 to *strongly disagree* = 6. PSI is divided into three factors: Problem Solving Confidence (PSC, i.e. self-evaluation of personal problem-solving abilities), Approach-Avoidance Style (AAS, i.e. tendency to approach or avoid different problem-solving activities) and Personal Control (PC, i.e. control of emotions during the act of solving a problem). On each subscale, higher scores correspond to lower self-evaluated problem-solving abilities. **This instrument showed a satisfactory internal reliability (α coefficients of .85, .81, .76, and .87 for PSC, AAS, PC and the total score, respectively) (Nota et al., 2009).**

Psychological Well-Being Scales (PWBS) (Ryff & Singer, 1996) is a self-rating inventory that assesses six areas of psychological well-being according to Carol Ryff conceptualization: autonomy (to live in accord with own personal convictions), environmental mastery (competence in managing environmental and life situations), personal growth (continuous personal development), positive relations (satisfying high-quality relationships), purpose in life (a belief that life has meaning and purpose), and self-acceptance (a positive view of self and past life). We utilized the 42-item reduced version because of its balance between length and depth of measurement (Ryff, 2014). **42-item PWB showed overall a good internal consistency (α coefficient = .817) (Sharma & Sharma, 2018), with individual dimensions α coefficients ranging from .70 to .84 (Ryff et al., 2017).** Answers were given on a Likert scale ranging from *strongly disagree* to *strongly agree*. Each scale score may range from 7 to 42 and the higher the scores, the higher the levels of psychological well-being.

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Data analyses

IBM SPSS Statistics (version 23) to perform all the data analyses was used. Significant level was set at 0.05, two-tailed. Continuous data were expressed as mean \pm standard deviation (SD) and categorical data were shown as frequencies and percentages.

Respondents were divided into 3 subgroups depending on their alcohol consumption: non-drinkers (if they reported to do not drink alcohol at all or to have tried it only once), drinkers (if they reported to have consumed alcohol occasionally or 5 or more drinks in one occasion less than monthly or never) and **BDers** (if they reported to have consumed 5 or more drinks on one occasion monthly or more). Chi-square test applied to contingency tables was used to evaluate the relationships between the 3 aforementioned subgroups and other categorical variables, such as gender, kind of school attended, lifestyle (i.e., sports activity, healthy diet, caffeine, cigarettes, cannabis, and other drug consumption), favorite alcoholic drink, drinking-related situations and motives. General Linear Model (ANOVA) was run to identify the relationship between the 3 subgroups based on alcohol use (fixed factor), age and grade point average (Dependent Variables; DVs). Bonferroni post hoc test for multiple comparisons was applied. The same statistical analyses were used to analyze differences in sociodemographic, lifestyle and psychological variables among adolescents who binge drink with different frequencies (monthly, weekly, daily or almost daily BD). Since no psychological difference between monthly, weekly, and daily **BDers** has been found, these 3 subgroups were merged in the investigation of psychological risk factors associated with BD. Stepwise multinomial logistic regression models were performed to explore psychological risk factors (allostatic overload, stressful life events, life satisfaction, psychological distress, problem-solving abilities, and psychological well-being dimensions) associated with BD, controlling their interaction with sex. The forward

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entry method started with a model that includes an intercept, sex, and all the psychological variables. The interaction between self-acceptance dimension and sex was added in the following model, whereas the interaction between purpose in life and sex in the last. The adjusted p value was set to 0.0016. Odds Ratio (OR) and its 95% confidence interval (CI) were estimated for each factor.

Results

Based on alcohol consumption, 3 subgroups have been identified: non-drinkers (49.9% of the total sample), drinkers (41.3%) and **BDers** (8.8%). The 3 subgroups did not show any difference between each other concerning sex, whereas they did about age ($F_{(2)}=28.224$; $p<0.001$) (Table 1). **BDers** were more likely to attend professional institutes rather than high schools ($\chi^2_{(2)}=19.488$; $p<0.001$) (Table 1) and to have a lower grade point average ($F_{(2)}=16.858$; $p<0.001$) than both non-drinkers ($p<0.001$) and drinkers ($p=0.014$). Moreover, the 3 subgroups showed several differences between each other concerning lifestyle (Table 1). Specifically, regarding alcohol consumption (results are presented in Table 2), **BDers** reported that they started drinking because their friends did (29.7%), and now they continue drinking to feel energetic (32.4%), especially on weekends (62.3%) (Table 2).

To better evaluate the phenomenon of BD at this early age, differences between monthly BD (71.1% of the **BDers**), weekly BD (25.5%), and daily BD (3.4%) were investigated (results are presented in Table 2). Few differences were found on sociodemographic and lifestyle variables (results are presented in Table 3). No statistically significant differences were shown on psychological variables (results are presented in Table 4).

Specific variables (i.e. stress level, hostility, positive relations and purpose in life

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dimensions) were associated with BD in comparison with non-drinkers, whereas only one variable (i.e. stress level) was associated with BD in comparison with drinkers (results are presented in [Table 5](#)).

Discussion

Prevalence of BD

In the present sample of 14-year-old Italian adolescents, 71% of BDers practice BD once a month, 26% once a week, and 3% daily. ~~among adolescents practicing BD, the majority binge monthly, followed by those who usually binge weekly and daily.~~ Daily BDers appear to be most at risk not only for the large amount of alcohol consumed, but also because they report a worse lifestyle: they are less likely to play sports and more likely to use drugs than those who binge more rarely. Furthermore, daily BDers consume more caffeine, smoke cigarettes and cannabis than their peers, even if these associations are not statistically significant. This represents an alarming finding since it has been reported that the synergistic effect of engaging in multiple unhealthy behaviors at the same time seem to worsen physical and mental health (Champion et al., 2018; El Ansari et al., 2018; Akasakia et al., 2019), educational performance (El Ansari et al., 2018) and to predict a greater alcohol consumption later in life (Akasakia et al., 2019).

Psychological distress and well-being dimensions associated with BD

Considering our total sample, specific psychological variables (i.e. stress, hostility, positive relations and purpose in life) are associated with BD in comparison with nondrinkers, whereas only one variable (i.e. stress level) is associated with BD also compared to occasional drinkers. In line with the literature (Chassin et al., 2002), BD is associated with a greater number of stressful daily chronic events (e.g. dissatisfaction and pressure at school, unsatisfying relationships with peers and parents) and significant

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events (e.g. separation from spouse/long-time partner or beginning of a new relationship, moving within the same city or to another city, financial or legal problems, death of a family member). An interesting result refers to the negative association between BD and hostility. Hampson et al. (2010) showed that hostile children were more likely to smoke and consume alcohol and marijuana after a few years. Instead, a study that investigated the association between hostility-anger and BD did not find any significant association (Carlson et al., 2010). These inconclusive findings can be explained by differences in sample and assessment measures for anger and hostility and should be better investigated in future research. In light of our results, we could hypothesize that young **BDers** try to deal with stress (higher number of stressful life events) adopting an externalizing mode (higher hostility-anger and substance use), as suggested by Patrick and Schulenberg (2014).

Relevant and innovative results in our study concern PWB. A higher imbalance in PWB dimensions (i.e. positive relations and purpose in life) is associated with BD. Even though having a balanced level of ‘positive relations’ entails the capacity of establishing quality relationships characterized by strong feelings of empathy, trust, and love (Ryff, 1989), higher scores in this PWB dimension could imply the tendency to excessively sacrifice one’s own needs and well-being for others. In our study, this characteristic represents a risk factor associated with BD. Since this dimension has never been investigated among young **BDers**, we can only rely on similar concepts. For instance, in a sample of adolescents aged 14-16 (Elisaus et al., 2018), BD was prevalent among those having good relationships with peers (i.e. those perceiving that peers liked them, finding it easy to talk with friends, spending evenings with friends and contacting friends using technology). As adolescents probably select peers who have similar substance use habits of their own, spending time with these user friends will further

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boost their substance use (Kuntsche et al., 2017). Another possible explanation is that who has a strong prosocial attitude could sacrifice his/her needs and well-being for others, becoming overwhelmed by their problems (Ruini & Fava, 2014) and engaging in risky behaviors (i.e. BD).

We also found that lower scores in purpose in life dimension are associated with BD. **BDers** seem to lack goals, aims, and direction, and to feel that life is meaningless. On the same line, even though this domain has never been investigated among young **BDers**, Brassai et al. (2011) showed an association between meaning in life, characterized by feelings that make life worth living (e.g. thinking of one's own life as part of a larger plan), and BD only among female adolescents.

~~Our findings support the importance of understanding that well-being is not given by the highest level of positive affect, happiness, and PWB, but by a balance between dimensions that allows the achievement of human flourishing and one's own potential, feeling good and functioning well in the society (Garamoni et al., 1991; Ryff & Singer, 1998; Fredrickson & Losada, 2005; Oishi et al., 2007; Ruini & Fava, 2014; Gatzler et al., 2019). Previous research, indeed, showed the following aspects: placing an excessive value on being happy is associated with depressive symptoms among adolescents (Gatzler et al., 2019). An excessive positivity can be detrimental to functioning (Fredrickson & Losada, 2005). Childhood cheerfulness can be associated with risky behaviors such as alcohol use in adulthood (Oishi et al., 2007), whereas deviations from optimal balance can be linked to mental disorders (Garamoni et al., 1991).~~

Our findings support the importance of considering that unbalanced levels in certain PWB dimensions (i.e., positive relations and purpose in life) can be risk factors associated with BD in Italian young adolescents. Indeed, not only low but also high

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scores of PWB could be detrimental for achieving a good adjustment in life (Ryff & Singer, 1998; Ruini & Fava, 2014). On the same vein, according to Cummins' theory (Cummins, 2014), subjective well-being below or above the normative range may bring to maladjustment or psychopathology.

Limitations

There are some limitations in the present research. First, the study is limited to Italian culture. One of the aims of our investigation, however, was just to fill a gap in the Italian research. Second, the cross-sectional design does not allow a causal relationship between psychological risk factors and BD. Even though longitudinal studies could clarify these results, our hypothesized direction is justified by evidence showing that PWB dimensions are concepts with modest or high degrees of stability (Intelisano et al., 2020). Indeed, according to the eudaimonic perspective, well-being represents more a trait-like concept rather than a transient feeling or emotion (Ryff, 1989; Intelisano et al., 2020). Third, the study relied on the administration of self-report questionnaires only. Although self-rated assessment is simple and cheap, this method has been questioned because of potential biases due to social desirability, underestimation of alcohol consumption and recall errors. Nevertheless, in adolescents, self-report measures seem to show good validity and reliability (Lintonen et al., 2004), especially when the assessment is anonymous (Brener et al., 2003). Moreover, the high rate of response (i.e., none of the participants refused to complete the survey) supports the feasibility and good acceptance of the self-rated assessment. Fourth, the use of ad hoc questions for measuring lifestyle (i.e. sports activity, diet, caffeine consumption, cigarette, and other drug use). Fifth, the study lacks an evaluation of race and ethnicity. Previous research, however, showed that among 14-year-old students, racial and ethnic disparities in the prevalence of BD are not detectable, since they start to emerge at an older age (Evans-

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Polce et al., 2015). Additionally, no differences in alcohol consumption between natives and second-generation immigrants in 23 countries (including Italy) were found, since the contact with the receiving culture diminishes the influence of the country of origin (Barsties et al., 2017).

Conclusion

According to the eudaimonic perspective, focusing on the promotion of specific strengths within young people may further protect against health risks. Indeed, BD adolescents showed several risk factors for psychophysical health (i.e. unhealthy diet, multiple substance abuse, high level of stress), with a tendency to externalize their psychological distress (hostility), as well as a higher imbalance in PWB dimensions. The strength of this study is to identify psychological risk factors associated with BD, which have not been considered so far (i.e. unbalanced PWB dimensions). To the best of our knowledge, research on primary prevention of BD is scarce and mainly focused on personality traits (Conrod et al., 2011; Lammers et al., 2017), social norms (Hanewinkel et al., 2017), behaviors, beliefs and motivation related to alcohol use (Jander et al., 2014). A novel approach called Well-Being Therapy (Fava, 2017) could be suitable to promote balanced levels of well-being in this population, as indicated by the promising findings of pilot studies with other specific targets (Fava & Ruini, 2014; Ruini et al., 2006, 2009; Tomba et al., 2010).

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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Table 1. Differences on socio-demographic variables and lifestyle between “nondrinkers”, “drinkers” and “binge drinkers”.

	Nondrinkers (N=841)	Drinkers (N=697)	Binge Drinkers (N=149)		
	Mean ± SD	Mean ± SD	Mean ± SD	F	<i>p</i>
Age	14.16 ± 0.59	14.28 ± 0.60	14.56 ± 0.81	28.224	<0.001
Grade Point Average (N/10)	7.01 ± 0.89	6.87 ± 0.92	6.53 ± 0.95	16.858	<0.001
	N (%)	N (%)	N (%)	χ^2	<i>p</i>
Sex					
<i>Male</i>	417 (52.7)	352 (53.2)	79 (56.4)	0.659	NS
<i>Female</i>	374 (47.3)	310 (46.8)	61 (43.6)		
Type of School					
<i>High School</i>	352 ^a (41.9)	281 ^a (40.3)	34 ^b (22.8)	19.488	<0.001
<i>Professional Institute</i>	489 ^a (58.1)	416 ^a (59.7)	115 ^b (77.2)		
Sport activity					
<i>no</i>	288 (34.5)	204 (29.4)	54 (36.5)	5.590	NS
<i>yes</i>	546 (65.5)	489 (70.6)	94 (63.5)		
Sport level					
<i>Amateur</i>	193 (38)	171 (38.3)	32 (37.6)	0.021	NS
<i>Agonistic</i>	315 (62)	275 (61.7)	53 (62.4)		
Fruits and vegetables consumption	588 (71.3)	490 (71.0)	93 (63.7)	3.572	NS
Healthy diet at home	596 ^a (74.9)	469 ^a (70.7)	80 ^b (59.7)	13.790	0.001
Caffeine	624 ^a (75.6)	601 ^b (87.5)	134 ^b (92.4)	47.307	<0.001
Tobacco smoking	54 ^a (6.5)	157 ^b (22.7)	88 ^c (59.1)	255.342	<0.001
Cannabis smoking	22 ^a (2.8)	113 ^b (16.5)	82 ^c (55.4)	303.132	<0.001
Use of other drugs	7 ^a (0.9)	39 ^b (5.7)	51 ^c (34.9)	253.545	<0.001

NS= not significant

Note: Different superscript letters indicate significant difference

Table 2. Differences on favorite alcoholic drink, first use, current drinking motives and situations between “drinkers” and “binge drinkers”.

	Drinkers (N=697)	Binge Drinkers (N=149)		
	N (%)	N (%)	χ^2	<i>p</i>
Favorite alcoholic drink				
<i>Spirits</i>	165 ^a (24.5)	66 ^b (44.9)		
<i>Beer</i>	294 ^a (43.7)	31 ^b (21.1)		
<i>Beer + Spirits</i>	25 ^a (3.7)	17 ^b (11.6)		
<i>Wine</i>	156 ^a (23.2)	15 ^b (10.2)	79.037	<0.001
<i>all</i>	13 ^a (1.9)	14 ^b (9.5)		
<i>Beer + Wine</i>	12 ^a (1.8)	3 ^a (2)		
<i>Wine + Spirits</i>	8 ^a (1.2)	1 ^a (0.7)		
Most common motives of first alcohol consumption				
<i>Friends drank</i>	137 ^a (20.4)	43 ^b (29.7)		
<i>Curiosity</i>	200 ^a (29.7)	32 ^a (22.1)		
<i>Relatives drank</i>	154 ^a (22.9)	20 ^b (13.8)		
<i>To feel better</i>	35 ^a (5.2)	18 ^b (12.4)	28.878	0.001
<i>It was a special occasion</i>	74 ^a (11)	11 ^a (7.6)		
<i>For the taste</i>	19 ^a (2.8)	9 ^b (6.2)		
<i>Relatives and friends drank</i>	24 ^a (3.6)	3 ^a (2.1)		
Most frequent motives of current alcohol consumption				
<i>To feel energetic</i>	83 ^a (15.5)	45 ^b (32.4)		
<i>To feel energetic/friendly and relaxed</i>	31 ^a (5.8)	18 ^b (12.9)		
<i>To feel less anxious/nervous</i>	46 ^a (8.6)	16 ^a (11.5)		
<i>To feel relaxed</i>	58 ^a (10.8)	12 ^a (8.6)	70.886	<0.001
<i>To feel more friendly</i>	43 ^a (8)	11 ^a (7.9)		
<i>For the taste</i>	135 ^a (25.1)	10 ^b (7.2)		
<i>To join relatives and friends</i>	22 ^a (4.1)	6 ^a (4.3)		
<i>To party</i>	64 ^a (11.9)	4 ^b (2.9)		
Most frequent situations of alcohol consumption				
<i>Weekends</i>	241 ^a (38.2)	91 ^b (62.3)		
<i>Evenings</i>	95 ^a (15.1)	20 ^a (13.7)		
<i>Parties and/or special occasions</i>	142 ^a (22.5)	17 ^b (11.6)	38.329	<0.001
<i>During the day and the night</i>	52 ^a (8.2)	7 ^a (4.8)		
<i>When relatives and/or friends do</i>	19 ^a (3)	0 ^b (0)		

NS= not significant

Note: Different superscript letters indicate significant difference

Table 3. Differences on socio-demographic variables and lifestyle between “monthly Binge Drinking”, “weekly Binge Drinking” and “daily Binge Drinking”.

	Monthly BD (N=106)	Weekly BD (N=38)	Daily BD (N=5)		
	Mean ± SD	Mean ± SD	Mean ± SD	F	<i>p</i>
Age	14.52 ± 0.805	14.66 ± 0.847	14.75 ± 0.5	0.512	NS
Grade Point Average (N/10)	6.58 ± 0.926	6.39 ± 1.056	6.5 ± 0.79	0.552	NS
	N (%)	N (%)	N (%)	χ^2	<i>p</i>
Sex					
<i>Male</i>	56 (56.6)	20 (55.6)	3 (60)	0.038	NS
<i>Female</i>	43 (43.4)	16 (44.4)	2 (40)		
Type of School					
<i>High School</i>	31 ^a (29.2)	3 ^a (7.9)	0 ^a (0)	8.770	0.012
<i>Professional Institute</i>	75 ^b (70.8)	35 ^b (92.1)	5 ^a (100)		
Sport activity					
<i>no</i>	30 ^a (28.6)	21 ^a (55.3)	3 ^a (60)	9.813	0.007
<i>yes</i>	75 ^b (71.4)	17 ^b (44.7)	2 ^a (40)		
Sport level					
<i>Amateur</i>	24 (35.8)	8 (50)	0 (0)	2.343	NS
<i>Agonistic</i>	43 (64.2)	8 (50)	2 (100)		
Fruits and vegetables consumption	62 (60.2)	27 (71.1)	4 (80)	2.010	NS
Healthy diet at home	57 (59.4)	19 (55.9)	4 (100)	2.910	NS
Caffeine	94 (91.3)	36 (94.7)	4 (100)	0.816	NS
Tobacco smoking	58 (54.7)	26 (68.4)	4 (80)	3.111	NS
Cannabis smoking	55 (52.4)	23 (60.5)	4 (80)	2.016	NS
Use of other drugs	31 ^b (29.8)	16 ^a (43.2)	4 ^b (80)	6.794	0.033

NS= not significant

Note: Different superscript letters indicate significant difference

Table 4. Differences on psychological correlates between “monthly BD”, “weekly BD” and “daily BD”.

	Monthly BD (N=106)	Weekly BD (N=38)	Daily BD (N=5)		
	N (%)	N (%)	N (%)	χ^2	<i>p</i>
Allostatic Overload	48 (47.5)	18 (48.6)	1 (25)	0.826	NS
	Mean \pm SD	Mean \pm SD	Mean \pm SD	F	<i>p</i>
Symptom Questionnaire					
<i>Anxiety</i>	9.29 \pm 4.75	9.37 \pm 4.92	7.67 \pm 3.69	0.177	NS
<i>Depression</i>	8.68 \pm 5.34	8.47 \pm 5.59	9.33 \pm 4.51	0.046	NS
<i>Somatization</i>	9.91 \pm 5.99	9.84 \pm 5.91	13 \pm 3.9	0.404	NS
<i>Hostility</i>	9.8 \pm 5.38	9.43 \pm 5.66	14.17 \pm 7.97	1.029	NS
PsychoSocial Index					
<i>Stressful events</i>	4.7 \pm 2.35	4.97 \pm 2.39	6.25 \pm 2.22	0.94	NS
<i>Life satisfaction</i>	2.55 \pm 1.03	2.41 \pm 1.09	3.5 \pm 1	1.971	NS
Problem Solving Inventory					
<i>Problem-Solving Confidence</i>	33.36 \pm 8.63	31.3 \pm 10.25	32.33 \pm 16.04	0.69	NS
<i>Approach-Avoidance Style</i>	51.13 \pm 9.82	51.8 \pm 13.89	51.33 \pm 16.86	0.05	NS
<i>Personal Control</i>	19.21 \pm 4.98	18.91 \pm 6.2	14 \pm 8.89	1.368	NS
Total Score	103.7 \pm 17.3	102 \pm 25.6	97.67 \pm 32.7	0.21	NS
Psychological Well-Being scales					
<i>Autonomy</i>	29.46 \pm 5.93	29.24 \pm 7.72	35 \pm 8.18	1.114	NS
<i>Environmental Mastery</i>	26.98 \pm 6.17	27.53 \pm 6.24	29.67 \pm 10.21	0.348	NS
<i>Personal Growth</i>	30.27 \pm 5.81	30.57 \pm 6.29	34.17 \pm 4.19	0.644	NS
<i>Positive Relations</i>	31.42 \pm 5.78	31.07 \pm 6.79	31.33 \pm 9.02	0.046	NS
<i>Purpose in Life</i>	26.89 \pm 6.18	27.19 \pm 7.53	25.33 \pm 10.1	0.118	NS
<i>Self-Acceptance</i>	25.89 \pm 6.21	25.31 \pm 6.95	28.5 \pm 5.77	0.385	NS

NS= not significant

Table 5. Association of psychological factors with binge drinking in comparison with “nondrinkers” and “drinkers”: multinomial logistic regression.

		95% CI for Odds Ratio			95% CI for Odds Ratio				
		B (SE)	Odds Ratio	Lower	Upper	B (SE)	Odds Ratio	Lower	Upper
		<u>NONDRINKERS</u>			<u>DRINKERS</u>				
Symptom Questionnaire									
	<i>Anxiety</i>	0.068 (0.033)	1.070	1.003	1.142	0.083 (0.033)	1.087	1.019	1.159
	<i>Depression</i>	0.005 (0.036)	1.005	0.936	1.078	-0.065 (0.036)	0.937	0.874	1.005
	<i>Somatization</i>	-0.008 (0.025)	0.992	0.945	1.041	0.016 (0.024)	1.016	0.969	1.066
	<i>Hostility</i>	-0.088* (0.028)	0.915	0.867	0.966	-0.030 (0.027)	0.970	0.920	1.023
PsychoSocial Index									
	<i>Allostatic Overload</i>	-0.003 (0.276)	1.003	0.584	1.725	-0.161 (0.274)	1.175	0.687	2.010
	<i>Stress</i>	-0.297* (0.050)	0.743	0.674	0.819	-0.173* (0.048)	0.841	0.766	0.924
	<i>Life satisfaction</i>	-0.139 (0.139)	0.870	0.663	1.144	-0.190 (0.137)	0.827	0.632	1.082
Problem Solving Inventory									
	<i>Problem-Solving Confidence</i>	0.011 (0.014)	1.011	0.983	1.039	-0.003 (0.014)	0.998	0.971	1.025
	<i>Approach-Avoidance Style</i>	-0.014 (0.010)	0.986	0.967	1.007	-0.012 (0.010)	0.988	0.969	1.008
	<i>Personal Control</i>	-0.026 (0.023)	0.975	0.931	1.020	0.009 (0.023)	1.009	0.964	1.055
Psychological Well-Being scales									
	<i>Autonomy</i>	-0.029 (0.018)	0.972	0.939	1.006	-0.018 (0.017)	0.982	0.949	1.016
	<i>Environmental Mastery</i>	0.024 (0.026)	1.024	0.974	1.078	0.046 (0.026)	1.047	0.996	1.101
	<i>Personal Growth</i>	0.003 (0.022)	1.003	0.960	1.047	-0.009 (0.022)	0.991	0.949	1.034
	<i>Positive Relations</i>	-0.077* (0.021)	0.925	0.888	0.964	-0.060 (0.021)	0.942	0.905	0.981
	<i>Purpose in Life</i>	0.094* (0.027)	1.098	1.042	1.157	0.066 (0.026)	1.069	1.015	1.125
	<i>Self-Acceptance</i>	0.011 (0.027)	1.011	0.959	1.067	-0.037 (0.027)	0.963	0.913	1.016
	Sex x Purpose in Life	-0.100 (0.035)	0.905	0.846	0.969	-0.063 (0.034)	0.939	0.878	1.003
	Sex x Self-Acceptance	0.050 (0.030)	1.051	0.991	1.114	0.093 (0.030)	1.097	1.036	1.163

Reference category: Binge drinkers

* significant association with *p* level set to 0.0016, after adjustment for multiple comparisonsThis item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>)**When citing, please refer to the published version.**