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Cross-national evidence for the clustering and psychosocial correlates of adolescent risk behaviours in 27 countries

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Background: According to Jessor's Problem Behaviour Theory (PBT) and Moffitt's theory of adolescence-limited antisocial behaviour, adolescent risk behaviours cluster and can be predicted by various psychosocial factors including parent, peer and school attachment. This study tested the potential influence of the sociocultural, or macro-level, environment on the clustering and correlates of adolescent risk behaviour across 27 European and North American countries. **Methods:** Analyses were based on data from the 2009–10 Health Behaviour in School-aged Children (HBSC) study. Participants compromised 56 090 adolescents (M_{age} = 15.5 years) who self-reported on substance use (tobacco, alcohol, cannabis) and early sexual activity as well as on psychosocial factors (parent, peer and school attachment). **Results:** Multiple group confirmatory factor analyses (with country as grouping variable) showed that substance use and early sexual activity loaded on a single underlying factor across countries. In addition, multiple group path analyses (with country as grouping variable) showed that associations between this factor and parent, peer and school attachment were identical across countries. **Conclusion:** Cross-national consistencies exist in the clustering and psychosocial correlates of substance use and early sexual activity across western countries. While Jessor's PBT stresses the problematic aspects of adolescent risk behaviours, Moffitt emphasizes their normative character. Although the problematic nature of risk behaviours overall receives more attention in the literature, it is important to consider both perspectives to fully understand why they cluster and correlate with psychosocial factors. This is essential for the development and implementation of prevention programmes aimed at reducing adolescent risk behaviours across Europe and North America.

Introduction

Adolescence, the transitional phase between childhood and adulthood, is a unique period of discovery and experimentation. While searching for more autonomy from parents and spending more (unsupervised) time with peers[1], adolescents increasingly find themselves in new contexts and start experimenting with adult-like and norm-breaking behaviours, such as substance use and sexual activity. For some adolescents, this experimentation turns into excessive rates of substance use and engagement in risky sexual behaviours, which can have serious consequences for their long-term physical and mental health.[2–5]

Researchers from a wide variety of countries, including the USA[6,7], Canada[8,9], Brazil[10], Israel[11] and Korea[12], have demonstrated that risk behaviours of adolescents often co-occur. Two of the most influential theories that consider this clustering are Jessor and Jessor's Problem Behaviour Theory (PBT).[13–16] and Moffitt's theory of adolescence-limited antisocial behaviour.[17] According to PBT, behaviours such as adolescent drinking, illicit drug use and early sexual involvement cluster among adolescents who have a general 'proneness' to problem behaviour [(the so-called problem behaviour syndrome (PBS)]. Individuals with PBS share a number of problematic features, such as low family attachment, strong peer orientation and low school attachment. In contrast to Jessor, Moffitt stresses the normative character of adolescent risk behaviours. She explains their clustering by the shared (perceived) adult-like status these behaviours have among adolescents. According to her theory, adolescent experimentation with substance use and sexual behaviours is indicative of normative adolescent development. As young people develop into adults, it is necessary that they break loose of their parents, turn away from conventional institutions like school, turn towards their peers and experiment with different behaviours and lifestyles to achieve important developmental tasks, such as individuation and the development of an identity.

Previous research based on national samples has provided supportive evidence for both theories in that low family attachment, strong peer orientation and low school attachment are among the strongest correlates of high engagement in substance use and sexual activity.[18–22] As these studies, however, used different methodologies, comparison across countries has been difficult. To the knowledge of the authors, only six studies have examined cross-national consistencies in the clustering of risk behaviours and their associations with psychosocial factors.[23–28] The largest and most recent study of this kind included eight countries around the world.[28] It is important to replicate and extend this work by conducting cross-national comparative research on a larger scale, as this type of research can provide insights into the potential influence of the sociocultural, or macro-level,[29] environment on the clustering and psychosocial

correlates of adolescent risk behaviours. If risk behaviours cluster and correlate with psychosocial variables equally across countries, then this would strengthen the external validity of both Jessor's and Moffitt's theories. Moreover, it might have important implications for cross-national collaboration of the public health sectors in European and North American countries with respect to the development and implementation of prevention programmes aimed at reducing adolescent risk behaviours.

The Health Behaviour in School-aged Children (HBSC) study provides a unique opportunity to cross-nationally compare data on the clustering of adolescent substance use and sexual activity and their psychosocial correlates. In this international collaborative effort, measures, sampling and administrative procedures are *a priori* designed to be consistent across participating countries, thus allowing for cross-national comparisons. In addition, the sampling design provides nationally representative estimates, as opposed to estimates reflecting smaller regions or communities of unknown generalizability. In the present study, we used data collected during the 2009–10 study cycle in 27 European and North American countries.

The purpose of this study was to examine cross-national consistencies in the clustering of substance use and sexual activity and their associations with parent–adolescent communication (as a proxy for family attachment), the number of evenings spent out with peers and school attachment, among 15-year-old adolescents. Its aim was explicitly not to contrast Jessor's and Moffitt's theories; rather, the theories are seen as complimentary in providing a context and explanation of the findings. Based on the assumption that developmental processes are invariant across adolescents from different cultural or ethnic groups,[23–28,30] we expected large cross-national consistencies.

Method

Sample and procedures

In the 2009–10 HBSC study[31], 43 countries and regions participated. Of these, 27 countries included measures on substance use and sexual activity. These countries, which were mainly European but diverse in legal, political, economic and social terms, were included in this study.

Participating countries used identical protocols for sampling and data collection. Samples were drawn by systematic cluster sampling in which the primary sampling units were either school classes or entire schools. The fieldwork took place between Fall 2009 and Spring 2010. Response rates at school level were >70% for the majority of countries. At the student level, the majority of countries had a response rate >85%. Data were collected by means of a standardized questionnaire administered in classroom settings. Students were assured that their responses would remain anonymous and confidential. A translation-back-translation process maximized language equivalence across countries. Adolescents aged 11, 13 and 15 years were invited to participate. A detailed description of the aims, theoretical framework and protocol of the HBSC study can be found elsewhere.[32]

The current analyses were restricted to 15-year olds because younger students were not asked the questions on cannabis use and sexual intercourse. Our final sample consisted of 56 090 adolescents (50.6% female; $M_{age} = 15.5$ years, SD = 0.36). For each country, the final sample was nationally representative in terms of geographical area (region), urban or rural geographic status and, if applicable, language spoken at home and educational level. The demographic background of adolescents in the final sample by country is presented in table 1.

Measures

Outcome variables

Adolescent substance use and sexual activity. Adolescent substance use and sexual activity were measured as a latent construct using four single items: (i) daily smoking. Adolescents were asked: 'How often do you smoke?' The original answer categories ('never', 'less than weekly', 'weekly but not daily', 'daily') were recoded into 'no daily smoking' and 'daily smoking'; (ii) having at least one episode of drunkenness in the previous month. Adolescents were asked: 'How often in the previous month have you drunk so much alcohol that you were really drunk?' Answer categories (ranging from 'never' to 'ten times or more') were recoded into 'never' and 'at least once'; (iii) using cannabis in the previous month, measured by the item 'how often have you smoked cannabis in the previous month?' Answer categories (ranging from 'never' to '40 times or more') were recoded into 'never' and 'at least once'; (iv) being sexually active. Adolescents were asked whether they had ever engaged in sexual intercourse ('yes'/'no').

Psychosocial factors

Parent–adolescent communication was measured using the following items: 'How easy is it for you to talk to (i) your mother and (ii) your father about things that really bother you?' Response categories ranged from 1 (very easy) to 4 (very difficult). The mean answer on these two items reflects parent–adolescent communication. A fifth category included the response 'I don't have a mother/father or I do not see her/him'. If adolescents did not have or see one parent, this variable was based on their response to the question on the parent that was present in their lives. If adolescents did not have or see both parents ($N = 521$; 0.9%), they received a missing value on this variable.

Evenings out with friends was measured using a single item: 'How many evenings a week do you usually spend out with your friends?' Answer categories ranged from 0 to 7 'evenings'.

School attachment was measured using a single item: 'How do you feel about school at present?' Responses ranged from 1 (I like it a lot) to 4 (I don't like it at all).

Confounders

Adolescent age, gender, family structure (the adolescent lives with his or her two biological parents vs. other) and family affluence were included as demographic confounders. Family affluence was measured using the Family Affluence Scale (FAS). This scale compromises four items asking the adolescents about the number of cars and computers at home, the number of family holidays per year and whether they have their own bedroom. The scale ranges from 0 to nine 9 and was transformed into two dummy variables, representing low to medium vs. high family affluence.[33] The FAS has good criterion validity across European and North American countries.[33]

Plan of analysis

First, descriptive statistics were computed and compared across countries. Next, an overall confirmatory factor analysis (CFA) was used to test the structure of a 'risk behaviour factor' (a latent factor measured by the four substance use and sexual activity items) across countries using Mplus (version 7).[34] In Mplus, it is possible to factor analyse dichotomous variables using weighted least-squared estimation methods. Figure 1 presents the factor structure.

To answer our first research question on cross-national consistencies (i.e., measurement invariance) in the clustering of adolescent risk behaviours, we conducted a set of multiple group confirmatory factor analyses (with country as grouping variable). Six models were tested. In Model 1, all factor loadings were free to vary across countries (default model). In Models 2–5, the single factor

Table 1 Descriptive statistics by country samples

Country sample	*N*	Age in years	Gender	Family structure	Family affluence[a]	Daily smoking	Drunk last month	Cannabis use last month	Sexual activity	Risk behaviour factor[b]	Parent–adolescent comm.[b]	Evenings out with friends[b]	School attachment[b]
		Mean (SD)	% Boys	% Two-parent family	Mean (SD)	%	%	%	%	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Austria	1820	15.35 (0.33)	48.6	72.0	5.98 (1.76)	19.6	30.3	6.1	31.6	0.15 (1.03)	−0.06 (0.78)	−0.02 (0.93)	0.17 (.82)
Belgium	2567	15.46 (0.36)	52.6	64.6	6.16 (1.80)	11.6	22.7	10.3	29.1	0.07 (1.07)	−0.24 (0.86)	−0.40 (0.95)	−0.27 (0.91)
Canada	5441	15.45 (0.36)	49.3	64.1	6.15 (1.77)	7.5	24.8	18.2	27.2	0.08 (1.10)	−0.09 (0.82)	0.03 (1.02)	−0.04 (0.90)
Czech Republic	1522	15.45 (0.33)	49.1	65.8	5.44 (1.84)	18.0	32.7	10.9	23.7	0.11 (1.11)	−0.04 (0.77)	0.08 (0.99)	−0.03 (0.81)
Denmark	1226	15.65 (0.33)	47.1	63.1	6.73 (1.56)	10.0	52.7	3.9	37.7	0.26 (0.96)	0.02 (0.79)	−0.23 (0.91)	0.11 (0.78)
Estonia	1398	15.78 (0.32)	47.3	60.7	5.73 (1.99)	12.7	27.1	3.7	22.0	−0.06 (0.89)	0.06 (0.65)	−0.05 (1.00)	−0.27 (0.74)
Finland	2110	15.68 (0.30)	47.8	70.3	6.07 (1.64)	14.5	34.0	4.4	22.4	0.03 (0.99)	−0.00 (0.74)	0.09 (1.07)	−0.21 (0.80)
France	1906	15.46 (0.36)	47.4	69.5	6.37 (1.76)	14.3	17.2	14.2	27.1	0.06 (1.12)	−0.39 (0.85)	−0.27 (0.99)	−0.03 (0.96)
Germany	1640	15.39 (0.35)	44.9	75.7	6.18 (1.70)	10.5	20.7	3.7	22.4	−0.14 (0.88)	−0.12 (0.78)	−0.13 (0.92)	0.12 (0.75)
Greece	1648	15.66 (0.32)	51.1	83.3	5.46 (1.82)	10.6	16.2	4.0	28.3	−0.13 (0.87)	−0.05 (0.76)	−0.09 (0.95)	−0.39 (0.87)
Hungary	1733	15.48 (0.33)	46.1	69.7	5.03 (1.95)	19.3	24.6	5.7	28.5	0.06 (1.06)	0.22 (0.65)	−0.18 (0.82)	0.33 (0.86)
Iceland	3680	15.47 (0.31)	50.9	69.7	7.13 (1.56)	5.8	17.5	3.6	28.9	−0.17 (0.83)	0.21 (0.76)	0.05 (0.93)	0.45 (0.72)
Ireland	1695	15.45 (0.36)	56.8	72.9	5.69 (1.68)	10.2	26.4	8.1	22.3	−0.01 (1.04)	0.04 (0.82)	0.01 (1.05)	−0.25 (0.97)
Latvia	1375	15.58 (0.33)	48.4	57.7	5.14 (3.04)	18.5	32.2	8.8	22.4	0.10 (1.04)	0.02 (0.74)	0.26 (1.06)	0.05 (0.89)
Lithuania	1792	15.67 (0.31)	52.7	67.6	5.14 (1.97)	20.3	35.3	5.5	19.5	0.11 (1.03)	−0.10 (0.81)	0.29 (1.04)	0.16 (0.92)
Luxembourg	1382	15.46 (0.36)	50.8	72.7	6.41 (1.78)	15.6	15.0	8.5	30.9	0.01 (1.05)	−0.10 (0.87)	−0.12 (0.91)	−0.30 (0.87)
Netherlands	1457	15.45 (0.36)	50.1	80.7	6.60 (1.53)	11.9	15.2	9.2	20.8	−0.09 (0.96)	0.30 (0.68)	−0.26 (0.88)	0.13 (0.83)
Poland	1410	15.68 (0.27)	48.6	81.3	5.11 (2.03)	9.9	17.7	7.7	15.7	−0.17 (0.89)	0.01 (0.80)	0.06 (1.00)	−0.19 (0.92)
Portugal	1553	15.46 (0.34)	43.8	77.5	5.97 (1.81)	6.7	11.5	5.3	21.5	−0.24 (0.80)	−0.13 (0.81)	−0.36 (0.85)	0.06 (0.80)
Romania	2002	15.10 (0.20)	52.2	78.6	4.28 (2.06)	14.4	22.8	3.1	32.9	−0.01 (0.90)	0.23 (0.73)	0.19 (1.13)	0.28 (0.80)
Slovakia	1914	15.35 (0.34)	50.2	75.0	4.86 (1.95)	12.1	21.5	5.5	12.7	−0.15 (0.91)	−0.14 (0.82)	0.30 (1.08)	−0.28 (0.99)
Slovenia	1815	15.60 (0.35)	50.4	80.1	6.23 (1.73)	13.9	28.5	10.0	27.8	0.11 (1.09)	0.16 (0.77)	−0.02 (0.94)	0.24 (0.91)
Spain	2003	15.46 (0.35)	48.0	80.7	6.00 (1.78)	13.8	25.5	16.0	21.4	0.05 (1.09)	0.03 (0.75)	0.12 (1.00)	−0.31 (0.93)
Switzerland	2246	15.35 (0.34)	50.7	74.9	6.26 (1.68)	11.4	18.8	13.8	19.6	−0.02 (1.06)	−0.14 (0.83)	−0.23 (0.91)	−0.14 (0.85)
Ukraine	1897	15.71 (0.33)	46.4	70.0	4.12 (1.95)	15.3	20.0	2.5	27.8	−0.06 (0.88)	0.18 (0.64)	0.37 (1.02)	0.23 (0.81)
Macedonia	1536	15.46 (0.33)	53.0	85.6	4.46 (1.92)	8.3	15.4	1.8	18.0	−0.26 (0.74)	0.33 (0.77)	0.34 (0.94)	0.39 (0.92)
UK	5322	15.60 (0.32)	48.5	63.5	6.07 (1.78)	10.0	37.2	8.9	31.0	0.13 (1.07)	−0.03 (0.81)	0.06 (1.00)	−0.09 (0.86)

a: Scale: 1 (low affluence) – 9 (high affluence).
b: Standardized scores; subscales used different metrics.
Findings from analyses of variance indicated significant between-group differences across the risk behaviour and psychosocial variables ($Ps < 0.001$).

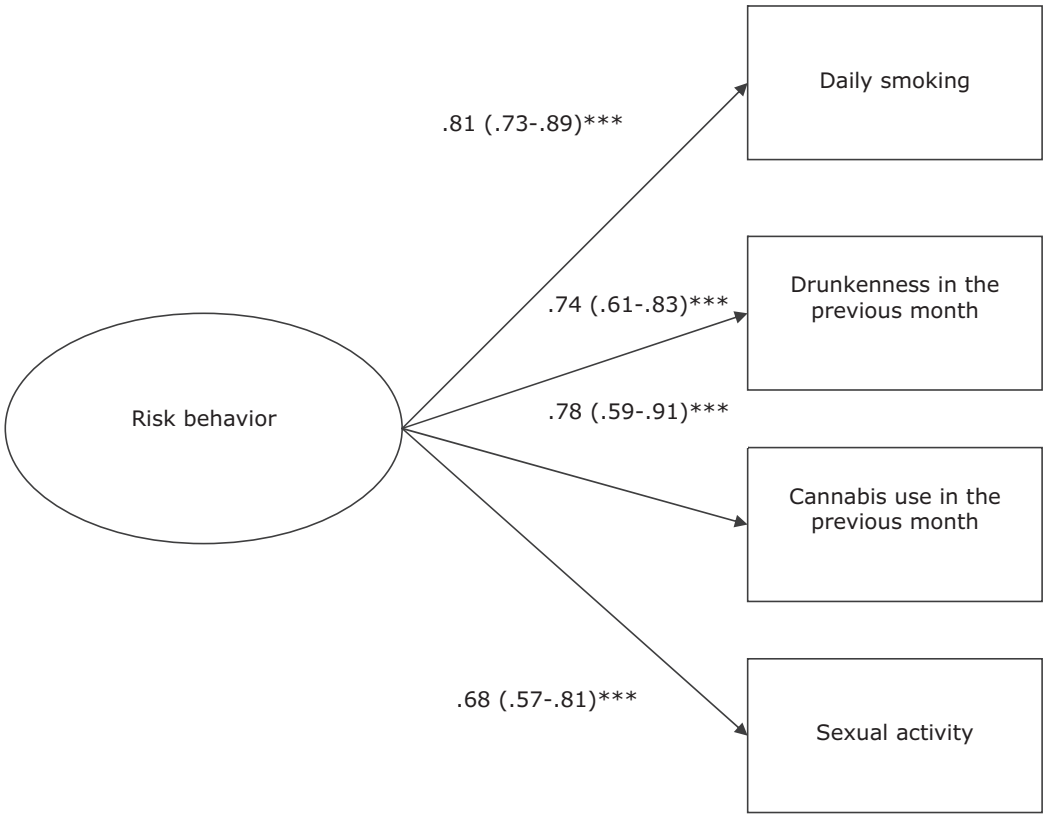

Figure 1 CFA of daily smoking, drunkenness, cannabis use and sexual activity across 27 countries (total sample), $\chi^2(2) = 55.13$, $P < 0.001$, $CFI = 0.998$, $TLI = 0.994$, $RMSEA = 0.022$. *** $P < 0.001$. The numbers in the parentheses are ranges of standardized factor loadings based on the total sample of each country

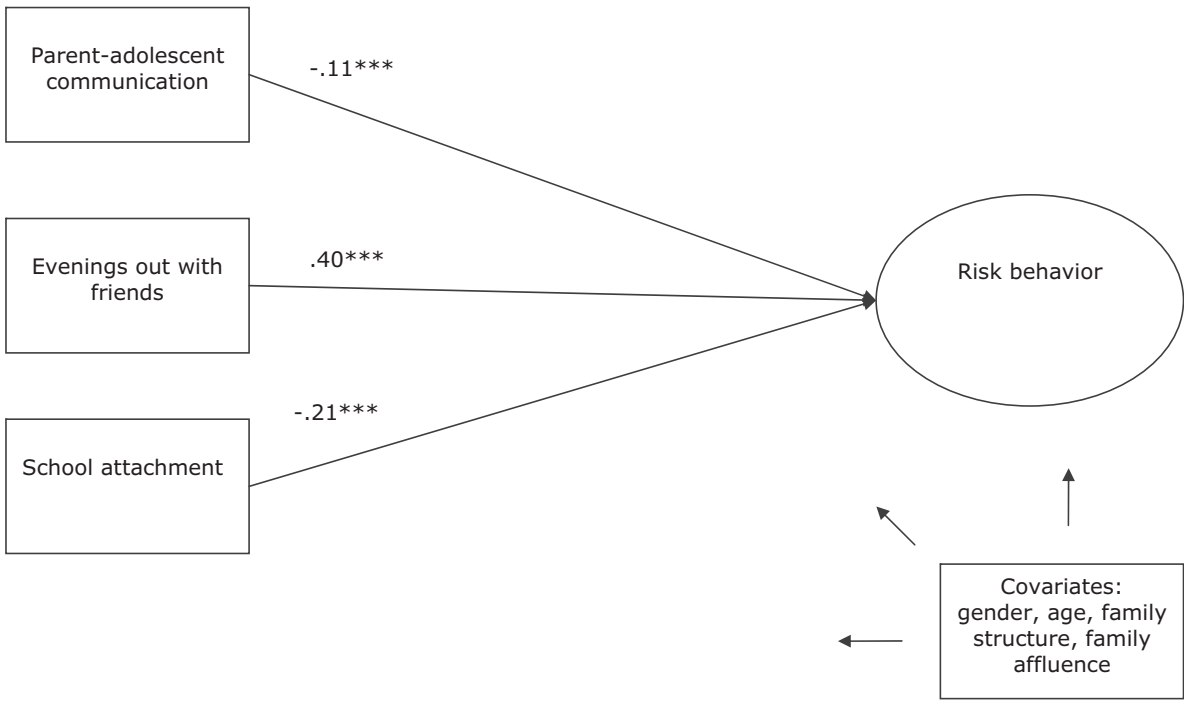

Figure 2 Path model predicting adolescent risk behaviour (total sample), $\chi^2(31) = 370.29$, $P = 0.000$, $CFI = 0.989$, $TLI = 0.980$, $RMSEA = 0.014$. *** $P < 0.001$

loadings of smoking, drunkenness, cannabis use and sexual activity (respectively) were constrained to be equal across countries. In Model 6, all factor loadings were constrained to be equal. The model fit statistics of the different models were compared, and the most parsimonious model with a good fit was selected (the model fit criteria are summarized below).

If the CFA with constrained paths had an acceptable fit, we proceeded with the path model of the associations between the three psychosocial factors and the risk behaviour factor (see figure 2). First, we tested the path model in an overall analysis.

To answer our second research question on cross-national consistencies in this path model, we used a multiple group path

Table 2 Model fit statistics of the CFA and the path model

Model	χ^2	*df*	*P*	*CFI*	*TLI*	*RMSEA*	$\Delta\chi^2$*(df)*	*P* $\Delta\chi^2$	Δ*CFI*	Δ*TLI*	Δ*RMSEA*
CFA model											
All loadings freely estimated	183.91	54	0.00	0.996	0.989	0.034	–	–	–	–	–
Smoking constrained	321.28	80	0.00	0.993	0.986	0.038	136.36 (26)	0.00	0.003	0.003	0.004
Drunkenness constrained	772.54	80	0.00	0.981	0.961	0.065	465.39 (26)	0.00	0.015	0.028	0.031
Cannabis constrained	292.14	80	0.00	0.994	0.988	0.036	118.88 (26)	0.00	0.002	0.001	0.002
Sexual activity constrained	470.75	80	0.00	0.989	0.978	0.049	251.04 (26)	0.00	0.007	0.011	0.015
All paths constrained	1052.60	106	0.00	0.973	0.959	0.066	824.08 (52)	0.00	0.023	0.030	0.032
Path model											
All paths freely estimated	1566.96	754	0.00	0.978	0.956	0.023	–	–	–	–	–
Parent–adolescent communication constrained	1584.25	780	0.00	0.978	0.958	0.023	37.72 (26)	0.06	0.000	−0.002	0.000
Evenings out with friends constrained	1568.88	780	0.00	0.979	0.959	0.023	19.33 (26)	0.82	−0.001	−0.003	0.000
School attachment constrained	1583.39	780	0.00	0.978	0.958	0.023	39.07 (26)	0.05	0.000	−0.002	0.000
All paths constrained	1757.49	832	0.00	0.975	0.955	0.024	235.37 (78)	0.00	0.003	0.001	0.001

CFI = comparative fit index; *TLI* = Tucker–Lewis index; *RMSEA* = root mean square error of approximations; Δ statistics indicate the difference with the default model (all paths freely estimated).

analysis (also with country as grouping variable). Five different models were compared. In Model 1, all hypothesized paths were freely estimated. In Models 2–4, the path between the clustered risk behaviours and parent–adolescent communication, evenings out with friends and school attachment (respectively) were constrained. In Model 5, all paths were constrained to be equal across countries. The model fit statistics of the different models were compared, and the most parsimonious model with a good fit was selected.

For all analyses, we assessed model fit with the chi-square fit statistic, the χ^2/df ratio and evaluative criteria that were not sensitive to sample size, namely, the comparative fit index (CFI),[35] the Tucker–Lewis index (TLI)[36] and the root mean square error of approximation (RMSEA).[37] The *TLI* and *CFI* are related to the total variance accounted for in the model and correct for model complexity, with values >0.90, indicating good model fit.[38]The *RMSEA* is related to the residual variance, with values <0.05 indicating a good fit, although values <0.08 are acceptable.[38] The comparison of the fit of the different models was based on the chi-square difference test and Chen's guidelines (i.e., the fit of the two models differs significantly if ΔCFI and $\Delta TLI > 0.010$ and $\Delta RMSEA > 0.015$).[39]

All analyses were corrected for cluster effects of pupils within the same school (primary sampling unit) by means of the option 'cluster is' in Mplus. Because samples in the current study were large, we used alpha = 0.001 to be conservative. Missing values were model estimated in Mplus.

Results

The risk behaviour factor

Table 1 presents the descriptive statistics of substance use and sexual activity by country. The findings from analyses of variance indicated significant between-group differences in the scores of all risk behaviours. Correlations among the risk behaviours across countries ranged from 0.48 (drunkenness last month and sexual activity; cannabis use last month and sexual activity) to 0.62 (daily smoking and cannabis use last month). These correlation statistics provide evidence of strong and significant associations among the different risk behaviours.

A CFA was run on the whole sample. The fit statistics of this analysis were good: $\chi^2(2) = 55.13$, $P = 0.000$, $CFI = 0.998$, $TLI = 0.994$, $RMSEA = 0.022$. The standardized factor loadings are presented in figure 1; they ranged from 0.68 (sexual activity) to 0.81 (daily smoking).

To test for potential similarities or differences in the structure of the risk behaviour factor across countries, we completed multiple group CFAs with country as grouping variable. The results of the nested model comparison can be found in table 2. In the initial comparison between Models 1 [freely estimated: $\chi^2(54) = 183.91$, $P < 0.001$, $CFI = 0.996$, $TLI = 0.989$, $RMSEA = 0.034$] and 6 [fully constrained: $\chi^2(106) = 1052.60$, $P < 0.001$, $CFI = 0.973$, $TLI = 0.959$, $RMSEA = 0.066$], the following difference statistics were found: $\Delta\chi^2(52) = 824.08$, $P < 0.001$, $\Delta CFI = 0.023$, $\Delta TLI = 0.030$, $\Delta RMSEA = 0.032$. Although the difference statistics revealed a statistically significant difference between the models, the fit of the constrained model was acceptable. This indicates that the cross-national differences in the factor structure were only minor.

To be conservative, we completed a series of the nested model comparisons to evaluate individual loadings. The results (table 2) indicated that especially the factor loading of drunkenness differed across countries. Yet, the differences were small: factor loading values of drunkenness were all above 0.60 and ranged from 0.61 (Denmark) to 0.83 (Iceland). As the model fit of the fully constrained model was still acceptable, we proceeded with this model to test the path model across all countries.

Associations between psychosocial factors and the risk behaviour factor

Descriptive statistics of the risk behaviour factor and its hypothesized psychosocial predictors by country are also presented in table 1. The analyses of variance indicated significant between-group differences among all scores. Multiple risk behaviour scores were highest in the UK and Austria and lowest in Portugal and Macedonia.

We then tested the path model in which the risk behaviour factor was associated with the psychosocial predictors on the total sample (across countries). This model had a good fit: $\chi^2(31) = 370.29$, $P < 0.001$, $CFI = 0.989$, $TLI = 0.980$, $RMSEA = 0.014$ (figure 2). Risk behaviour was positively associated with evenings out with friends and negatively associated with positive parent–adolescent communication and school attachment. This model explained 43% of the variance in substance use and sexual activity.

To test for potential similarities or differences in the associations between psychosocial factors and adolescent risk behaviour across countries, we completed multiple group path analyses. As can be seen in table 2, no significant differences were found in model fit among the fully estimated, partially constrained or fully constrained models. This indicates that the hypothesized associations in our model were similar across countries.

Discussion

In this study, we sought to test the cross-national applicability of a 'risk behaviour factor' based on smoking, drunkenness, cannabis use

and sexual activity and its associations with a set of psychosocial predictors in 27 national samples of adolescents in Europe and North America. To date, only a modest number of cross-national studies have addressed this topic.[23–28]

Our analyses provide evidence of strong similarities between countries in the clustering of adolescent risk behaviours. Although some differences in the clustering existed (especially with respect to the drunkenness item), the overall similarities are substantial and remarkable, particularly because of evident differences across contexts in the cultural, political, legal, demographical, social and religious domains. With such a large number of countries that, for instance, differ in terms of cultural values on the acceptability of adolescent drunkenness, cannabis use and sexual activity, the identified differences appear to be logical from a methodological perspective, yet minor from a conceptual perspective. Future research may examine cross-national differences in drunkenness as an indicator of adolescent risk behaviour in more detail.

Associations between these clustered risk behaviours and a set of psychosocial predictors were also found to be similar across countries. This is consistent with the few existing studies that examined cross-national consistencies in the clustering of adolescent risk behaviours and their psychosocial correlates in a smaller number of countries. These studies compared the USA, Taiwan and China;[23] the USA, China, Korea and Czech Republic;[24] the USA, Korea and China;[25] China and the USA;[26] Georgia and Switzerland;[27] or Hungary, the Netherlands, Slovenia, Spain, Switzerland, Taiwan, Turkey and the USA.[28]

This study extends the evidence for the (external) validity of Jessor's problem behaviour framework,[13–15] stating that adolescent risk behaviours do not occur randomly but co-occur and share common psychosocial risk factors. While Jessor's PBT underlines the problematic nature of adolescent risk behaviours, Moffitt[17] emphasizes that adolescent experimentation with substance use and sexual behaviours is indicative of normative adolescent development and may even contribute to the achievement of important developmental tasks. As such, the results of our study may be understood in the light of a globalized adolescent culture in which distancing from parents and more conventional institutions like school, intensifying peer contacts and experimenting with new adult-like behaviours reflect normative aspects of adolescent development. Although the problematic nature of risk behaviours has received more attention in the literature, it is important to also consider the normative perspective to fully understand why risk behaviours cluster and correlate with specific psychosocial correlates. This is essential for the development and implementation of prevention programmes aimed at reducing adolescent engagement in excessive and multiple risk-taking behaviours.

The strengths of the present study include the utilization of a cross-national comparative method, the use of an ecological-developmental framework, the use of nationally representative samples and the combination of CFA techniques and structural equation modelling. Limitations include the cross-sectional nature of the study, its reliance on a single method of measurement, the modest breadth of predictors and indicators for risk behaviour and the use of single items, which were largely due to the limited availability of measures.

Our findings have implications for our understanding of not only how youth develop in general but also of how similarly they develop in different countries. A theoretical implication is that developmental processes with respect to adolescent substance use and sexual activity might be invariant across adolescents from different cultural groups. As such, they may be considered core features of globalized adolescent peer culture. In the field of public health, it may be beneficial for European and North American countries to collaborate in developing and implementing prevention programmes aimed at reducing adolescent risk behaviour.

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Key points

- This study extends the (external) validity of Jessor's PBT and Moffitt's theory of adolescence-limited antisocial behaviour by revealing cross-national consistencies in the clustering and psychosocial correlates of substance use and sexual activity among adolescents from 27 western, mainly European, countries.
- The clustering and psychosocial correlates of adolescent risk behaviours can be explained in two different ways: Jessor's PBT underlines the problematic nature of adolescent substance use and sexual activity, whereas Moffitt's theory of adolescence-limited antisocial behaviour emphasizes that risk behaviours reflect normative aspects of adolescent development. To fully understand why adolescent risk behaviours often co-occur and correlate with psychosocial factors, both perspectives should be considered.
- A theoretical implication of this study is that psychosocial processes related to adolescent substance use and sexual activity might be invariant across adolescents from different cultural groups.
- An implication for the field of public health is that it may be beneficial for European countries to collaborate in developing and implementing prevention programmes aimed at reducing adolescent engagement in excessive and multiple risk-taking behaviours.

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