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The Association Between Risk and Protective Factors and Caribbean Adolescents' Risk-Taking Behaviours

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Abstract

Adolescent risk-taking is of particular concern in the Caribbean, as individual and social problems are on the rise. To develop effective prevention and intervention programmes for these youth, it is imperative to understand the relationship between the factors which influence this behaviour. This study had five main purposes: the first three investigated the association between risk-taking and individual risk factors, social risk factors, and family protective factors respectively. The final two investigated whether family-related protective factors can buffer these associations. A 2-year longitudinal study was conducted in Sint Maarten. There were 378 adolescents who participated in Wave 1 and Wave 2, ranging from 11-19 years. Participants completed scales measuring; depression; behavioural disinhibition; peer attitudes; peer pressure; parental monitoring; parental support; and engagement in risk-taking. Results indicated both individual risk factors (depression and disinhibition) were significantly associated with risk-taking, however, both social risk factors (deviant peer attitudes and peer pressure) were not significantly associated with risk-taking. Additionally, the protective factor parental monitoring, significantly buffered the association between depression and risk-taking. These findings indicate that while individual risk factors are associated with adolescents' increased risk-taking, family-based interventions which increase parental monitoring may be effective in reducing this risk-taking.

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Role of Risk and Protective Factors in Caribbean Adolescents' Risk-Taking Behaviours

Adolescence is a critical period of development which shapes the life of every adult, and sadly can also shape the course of mental health problems (Dooley, Fitzgerald & Giollabhui, 2015). Moreover, adolescence is a time of heightened risk-taking, with the greatest threats to wellbeing coming from self-inflicted causes (Steinberg, 2008). Risk-taking not only endangers the adolescent taking part, but also endangers society (Steinberg, 2004). Additionally, it can inflict a large economic and social cost; adolescents may end up in treatment facilities (Aksu et. al, 2022; Boulger & Olson, 2011; Indig, Frewen, & Moore, 2016), which can lead to long term financial and psychological cost for both the individual and society. Therefore, it seems crucial to attempt to reduce adolescents' risk-taking, to create an improvement in the overall wellbeing of the population.

While adolescent risk-taking is a global concern (Ohene, Ireland & Blum, 2005), in recent years, it is of particular concern in the Caribbean, as social problems rise: gang violence has been increasing (Brathwaite, 2009; Maguire & Fishbein, 2016), and adolescents' risk-taking is positively associated with peer engagement with gangs (Albert & Steinberg, 2011). Adolescents are also more prone to substance abuse, delinquency and sexual risk-taking if they perceive it among their peers, and are in unpredictable social settings (Blakemore & Mills, 2014; Mason et al., 2017; Reynolds & Crea, 2015; Pilgrim & Blum, 2012). In Sint Maarten, for example, many adolescents face high exposure to violence, substance abuse and poverty (Unicef, 2020). Therefore, there are a combination of factors which may influence Caribbean adolescents risk-taking, however, the association among these factors, particularly in this population, is unclear. The present research investigates the association between individual, social and family risk and protective factors in Caribbean adolescents' lives, and explores the role these factors play in their risk-taking.

Defining risk behaviours

This research is drawing on The Problem Behaviour Theory (Jessor, 1987) which suggests risk-taking behaviours cluster in individuals, if they serve a common social or psychological purpose. These correlations have been confirmed in Caribbean youth samples (Maharaj et al. 2009; Ohene et al., 2005; Pilgrim & Blum, 2012; Pozuelo, Desborough, Stein & Cipriani, 2021; Ruprah, Sierra & Sutton, 2017). The behaviours being investigated in this research are substance use, delinquency and sexual risk-taking, as they are of particular concern in the Caribbean (Maharaj et al. 2009; Ohene et al., 2005; Pilgrim & Blum, 2012; Pozuelo et al., 2021; Ruprah et al., 2017; Unicef, 2020).

Risk and protective factors in adolescents' risk-taking

To define risk and protective factors, the current study is drawing on the Theoretical Buffering Model (Fitzpatrick, 1997) which predicts risk-taking. The model states risk factors increase the likelihood of risk-taking. Other researchers have also defined risk factors as those which increase the chance of maladaptive outcomes, and often arise from disengagement or dysfunction, at the individual, family, peer and community level (Garwick, Nerdahl, Banken, Muenzenberger-Bretl & Sieving, 2004; Rose, Holmbeck, Millstein-Coakley & Franks, 2004). The model describes protective factors however, as those which insulate an individual from negative circumstances, and other researchers have also defined them as factors which buffer the effects of risk factors (Cha & Nock, 2009; Fitzpatrick, 1997; Rose et. al, 2004; Ruprah et al., 2017).

Fitzpatrick (1997) described that risk factors fall into four categories: *individual* (e.g. personality), *family* (e.g. family disorganisation), *school* (e.g. academic failure), and *environment* (e.g. antisocial communities), while protective factors fall into three categories: *individual* (IQ, resilient temperament), *bonding* (e.g. parental support), and *healthy beliefs and standards* (e.g. established rules and expectations). The following literature review will

discuss which risk and protective factors appear to have the strongest association with Caribbean adolescents' risk-taking.

Review studies on Caribbean adolescents' risk-taking

There are four important review papers that investigate this association among a Caribbean adolescents' sample. The first, completed by Pozuelo et al. (2021) was a meta-analysis on 33 studies from low/middle-income countries, five of which from the Caribbean. Results indicated adolescents who had depressive symptoms were significantly more likely to engage in substance use, delinquency, risky sexual behaviour and suicidal behaviour, compared to non-depressed adolescents. Additionally, females were more likely to engage in risky sexual behaviours. The second review paper conducted a meta-analysis, investigating adolescent risk-taking in 15 Caribbean and Latin American countries (Ruprah et al., 2017). The study controlled for four risk factors (male gender, skipping school, depression, and attempted suicide) and two protective factors (engaged parenting and prosocial peers), and measured the risk-taking behaviours: substance use, delinquency and risky sexual behaviour. The results indicated Caribbean countries had higher rates of risk factors and risk behaviours and lower rates of protective factors, than Latin countries. Additionally, engaged parenting was associated with reduced risk-taking, however, this association was weaker in Caribbean countries. One reason for these differences may be that risk factors from domains which were not controlled for, such as the *environment* category, are more influential in Caribbean adolescents' risk-taking, than protective factors from the *bonding* category.

The third paper was a literature review of 95 studies in the Caribbean, which all investigated risk and protective factors associated with adolescent risk-taking (Maharaj et al., 2009). Findings indicated that the risk factors: male gender, family supporting drug-use, absence of religious involvement, poor school performance and rage were associated with substance use. Additionally, the risk factors: breakdown in family structure, domestic

violence, drug abuse, and gang association were associated with delinquency. Third, the risk factors: male gender, depression, low supervision, history of abuse, family instability, and single-parent households were associated with risky sexual behaviours. Fourth, the protective factors: supportive parent-child relationships, attending church and family connectedness were associated with reduced risky sexual behaviours. The fourth study by Pilgrim and Blum (2012), was a literature review on 30 studies in 13 Caribbean countries who investigated adolescents' sexual risk-taking. Seven major risk factors were reported: male gender, depression, rage, high self-efficacy, poor parent-child relationship, history of abuse, and peer pressure. Qualitatively, youth who perceived their peers to be sexually active, approving of sex and involved in gangs, were more likely to be sexually active. Additionally, family connectedness, parental monitoring, and school connectedness were associated with decreased risk-taking.

These four review studies provide valuable insight into the roles of risk and protective factors in Caribbean adolescents risk-taking. Firstly, adolescents' increased engagement in substance use, delinquent behaviour and risky sexual behaviour was associated with risk factors from the *individual* (depression, male gender, age, self-esteem), *family* (substance use approval, low family support and monitoring, domestic violence, and single-parent households), *school* (poor performance and skipping school) and *environment* (low SES, deviant peers, peer pressure and association with gangs) categories. Second, adolescents' decreased engagement in risk-taking, was associated with protective factors from the *individual* (psychological wellbeing and religiosity), and *bonding* (engaged parenting, positive parental support and monitoring and family connectedness) categories. While these findings are informative, they have some limitations. First, they do not report on the role protective factors can play in buffering the effect of risk factors. Second, the effect sizes of the associations between risk factors and risk-taking versus protective factors and risk-taking

was not reported. These limitations have consequences on the development of intervention strategies, as it is unclear whether the addition of protective factors for adolescents who already possess risk factors, could be effective in reducing risk-taking.

Investigating the buffering effects of protective factors

To our knowledge, there have been two single-empirical studies completed in the Caribbean, which address the above-mentioned limitations. Blum and Ireland (2004) sampled adolescents from nine Caribbean countries and reported three major findings. First, risk factors from the *individual*, *school* and *environment* categories (rage, skipping school and abuse) were associated with increased delinquency. Second, rage had the strongest association with increased substance use (alcohol). Third, when risk factors were held constant and protective factors were added, there was the strongest effect on (reduced) risk-taking, in comparison to the effect of (increased) risk-taking, when protective factors were held constant and risk factors added. These results indicate the presence of *bonding* protective factors may be more effective in reducing risk-taking, than removing risk factors, specifically *bonding* protective factors, may buffer the effects of *individual* and *environment* risk factors.

Secondly, Maguire and Fishbein (2016) compared the effects of risk and protective factors for students in Trinidad and Tobago. *Family* risk factors (family disorganisation, conflict, history of antisocial behaviour) and *family/bonding* protective factors (family attachment and rewards for prosocial involvement) were measured. The findings produced contrasting results to Blum and Ireland (2004): risk factors had a significantly stronger association with risk-taking in comparison to protective factors. The researchers proposed their contrasting results may be due to the protective factors being overwhelmed by the adverse conditions the Caribbean youth are exposed to, such as *environmental* risk factors, which were not measured. Additionally, only *family/bonding* risk and protective factors were

measured, so conclusions can only be made that *family* protective factors could not buffer *family* risk factors.

Justification for the present study

Taking the above-mentioned research into account, there are four limitations. First, previous research has investigated risk and protective factors and Caribbean adolescents' risk-taking (Maguire & Fishbein, 2016; Maharaj et al., 2009; Pilgrim & Blum, 2012; Pozuelo, et al., 2021; Ruprah et al., 2017), however, only Blum and Ireland (2004) investigated if protective factors from one category, can buffer risk factors from another. This limited data means substantiated conclusions cannot be made on whether adding protective factors into high-risk Caribbean youths' lives could decrease risk-taking. Second, Pilgrim and Blum (2012) is the only study which investigated the association between deviant peers and risk-taking, however, they only investigated sexual risk-taking. Third, there is an abundance of research which has provided evidence on the association between behavioural disinhibition and risk-taking (Nigg & Nagel, 2016; Romer, 2010; Ryan, MacKillop & Carpenter, 2013; Schepis, McFetridge, Chaplin, Sinha & Krishnan-Sarin, 2011; Young et al. 2009; Zucker, Heitzeg, & Nigg, 2011), however, there is a lack of empirical research on this within Caribbean samples. Finally, none of the aforementioned research in the Caribbean was longitudinal, meaning previous risk-taking could not be controlled for.

To address these limitations, the present research is drawing from a 2-wave longitudinal study of adolescents living in Sint Maarten, focusing on three risk-taking behaviours: *substance use*, *delinquency*, and *sexual risk-taking*. Four risk factors are being investigated: two from the *individual* category; *depression*, as it has frequently been reported as a risk factor (Maharaj et al., 2009; Pilgrim & Blum, 2012; Pozuelo et al., 2021), and *behavioural disinhibition* as it has scarcely been reported on in a Caribbean population. From the environmental category; *peer pressure* and *deviant peer attitudes* are being studied

as these factors can be associated with risk-taking (Albert & Steinberg, 2011; Fitzpatrick, 1997; Garwick et al., 2004; Mason et al., 2017; Pilgrim & Blum, 2012; Reynolds & Crea, 2015), for the present research, this category is named *social*, as they are related solely to peers. Finally, the *family* protective factors that are being studied are *parental monitoring* and *parental support*, as there is an abundance of evidence that *family* protective factors are associated with reduced risk-taking (Bean, Barber & Crane, 2006; Blum & Ireland, 2004; Grant et al., 2000; Maguire & Fishbein, 2016; Maharaj et. al, 2009; Pilgrim & Blum, 2012).

The main purposes of this research is to examine:

1. The association between *individual* risk factors and engagement in risk-taking. It is hypothesised that they will be significantly associated.
2. The association between *social* risk factors and engagement in risk-taking. It is hypothesised that they will be significantly associated.
3. The association between *family* protective factors and engagement in risk-taking. It is hypothesised that they will be significantly associated.
4. Whether *family* protective factors can buffer the association between *individual* risk factors and risk-taking? It is hypothesised that they will buffer.
5. Whether *family* protective factors can buffer the association between *social* risk factors and risk-taking? It is hypothesised that they will buffer

Method

Participants

The sample used in the present study is part of a larger 2-year longitudinal study, in Sint Maarten in the Caribbean, called 'The Adolescent Risk-Taking Project', which began in 2012 (Defoe, 2016). In 2012 in Wave 1(W1), there were 403 participants, however, due to missing data and drop-out, the final sample of participants who participated in both W1 and Wave 2(W2) was 378 (N=378). Of these participants 178 (47.1%) were male and 200 (52.9%) were female. In W1, participants ranged in age from 11 to 19 years, with a mean age of 14.2, (SD=1.67). In W2, participants ranged in age from 12 to 19 years, with a mean age 15.05 (SD=1.66). Most adolescents (257, 67.9%) reported that they were born in Sint Maarten, and the remaining adolescents were born on other Caribbean islands (106, 28%), and the final group reported they were born in Europe(15, 4.1%). Regarding parents' marital status, participants reported their parents were married or living together (160, 42.4%), divorced or separated (98, 25.8%) or never lived together (120, 31.8%). With regards to education streams, majority were in the VSBO TL (MAVO) (157, 41.6%) and the remainder were in VSBO(11, 2.8%), VSBO KBL (116, 30.6%), HAVO (40, 10.7%), HAVO VWO (47, 12.5%) and (7, 1.8%) were following a different education stream.

Bias checks were completed comparing participants who had data for the risk-taking behaviours measured at W1 and W2 to those who did not have complete data. A number of independent t-tests and chi-square tests revealed there were no significant differences for the drop-out group for gender, depression, behavioural disinhibition, deviant peer attitudes, peer pressure and parental support. However, chi square analyses revealed significant differences for age (8, N= 340)=17.10, $p=.029$, type of education (5, N=349)=11.75, $p=.038$ and a t-test indicated significant differences for parental monitoring ($M=3.01$, $SD=.549$) $t(248)=2.18$,

$p=.026$. These findings indicate that participants who were older, in lower academic education streams, and had lower parental monitoring disproportionately dropped out.

Procedure

Participants were recruited from two Dutch-speaking high schools; the schools were first emailed and then called. Parents received information letters about the research project as well as dissent letters that could be returned to the schools if parents did not want their children to participate. Data-collection took place at schools, and was led by trained research assistants. Participants had their name entered in a raffle for a chance to win a free lunch or movie vouchers. The questionnaires took 45-60 minutes to complete.

Measures

W1 and W2 Risk-Taking

The risk-taking behaviours that were measured were: substance use (alcohol, tobacco and soft drug use), delinquency and sexual risk-taking. These behaviours were grouped based on Problem Behaviour Theory (Jessor, 1987) and then a combined risk score was created for each participant. As these measures had inconsistent answering scales, Z scores were first computed and added together, so participants had a score for each behaviour. Next, if participants scored one SD above the mean or higher, they received a 1 for this behaviour, and if they scored below this they received a 0. These scores were then added together, so that each participant received a score ranging from 0-5, for W1 and W2 respectively.

To measure *substance use* items were used from The Risk Behaviour Survey (cited in Nieuwenhuijzen et al., 2009), measuring participants' frequency and severity of alcohol, tobacco and soft drug use. Example items are "How many times have you consumed five or more drinks (alcohol) in a row in the past month?", "How many cigarettes do you smoke on

average per week?" and "Have you ever bought soft drugs for your own use or sold soft drugs?". The three measures used 5 and 7-point Likert answering scales. The Cronbach's alpha was $\alpha=.92$ in W1 and $\alpha=.73$ in W2 for alcohol use, $\alpha=.82$ in W1 and $\alpha=.73$ in W2 for tobacco use, and $\alpha=.84$ in W1 and $\alpha=.79$ in W2 for soft drug use, indicating good reliability for all measures at both waves.

To measure *delinquent behaviour* International Self-Reported Delinquency Questionnaire (Junger-Tas, Marshall & Ribeaud, 2003; Junger-Tas, Terlouw & Klein, 1994) was used, the present study used six items which measured engagement in minor delinquency, stealing and vandalism. An example item is "Have you ever deliberately destroyed something, such as a bus/tram shelter, a window, a seat in the tram/train or a car?", each question was measured on five point Likert Scale, ranging from 'never' to 'yes, 3 times or more in the last 12 months'. Cronbach's alpha was $\alpha=.75$ in W1 and $\alpha=.75$ in W2, indicating good reliability. Finally, to measure *sexual risk-taking*, six questions were used from the Cognitive Appraisal of Risky Events questionnaire (Fromme, Katz & Rivet, 1997). Items investigated participants condom use, contraception use, having sexual intercourse with multiple partners and having sexual intercourse with someone they just met. An example item was "Have you ever had sex with different partners?", each question was measured on five point Likert Scale, ranging from 'never' to 'always'. If participants answered 'no', to question 1 "Have you ever had sex?", then they received a score of 0 (meaning no risk) for the other five questions on this scale. Cronbach's alpha was $\alpha=.56$ in W1 and $\alpha=.53$ in W2, indicating moderate reliability in both.

W1 Risk Factors

To measure the individual risk factors, *depression* was measured using Kandel and Davies (1982), translated by Decovic (1996) Adolescent Depression Questionnaire (VDA) which is a 6-item questionnaire. Adolescents answered questions using a 5-point Likert scale,

ranging from 'never' to 'very common', rating how often these feelings had occupied them in the past six months. An example item is "I felt too tired to do anything". Cronbach's alpha was $\alpha=.76$ indicating good reliability. Additionally, *behavioural disinhibition* was measured using The Behavioural Inhibition System subscale (Carver & White, 1994) the present study used the seven items which measure disinhibition. An example item is "I'm worried about making mistakes", each question was measured on four point Likert Scale, ranging from 'totally disagree' to 'totally agree'. Cronbach's alpha was $\alpha=.58$ indicating moderate reliability.

To measure the social risk factor, *deviant peer attitudes*, participants were asked what the majority of their friends would think about: alcohol use; tobacco use; soft drug use; and delinquency. These questions were answered using a five-point Likert Scale, ranging in 'approve of this completely', to 'disapprove of this completely'. An example item is "What do the majority of your friends think if you would drink alcohol several times a week?". Cronbach's alpha was $\alpha=.73$ indicating good reliability. Secondly, to measure *peer pressure* The Peer Pressure Scale (Clasen & Brown, 1985) was used, adolescents responded to this eight-item questionnaire using a four-point Likert scale, ranging from 'a lot' to 'no pressure', to rate how likely they are to receive pressure from their peers. Each item was written as it's opposite, for example item three was: "how strong is the pressure from your friends to: drink beer or spirits/not drink beer or spirits". Cronbach's alpha was $\alpha=.75$ indicating good reliability.

W1 Protective Factors

Parental monitoring was measured using Parenting Practices (Kerr & Stattin, 2000), this is a 20-item questionnaire, however, the present study used the 13 questions which measured supervision, and disregarded the questions measuring communication. An example item is "Does at least one of your parents know what you do in your spare time?", each

question was measured on five point Likert Scale, ranging from 'never' to 'always'.

Cronbach's alpha was $\alpha=.76$, indicating good reliability.

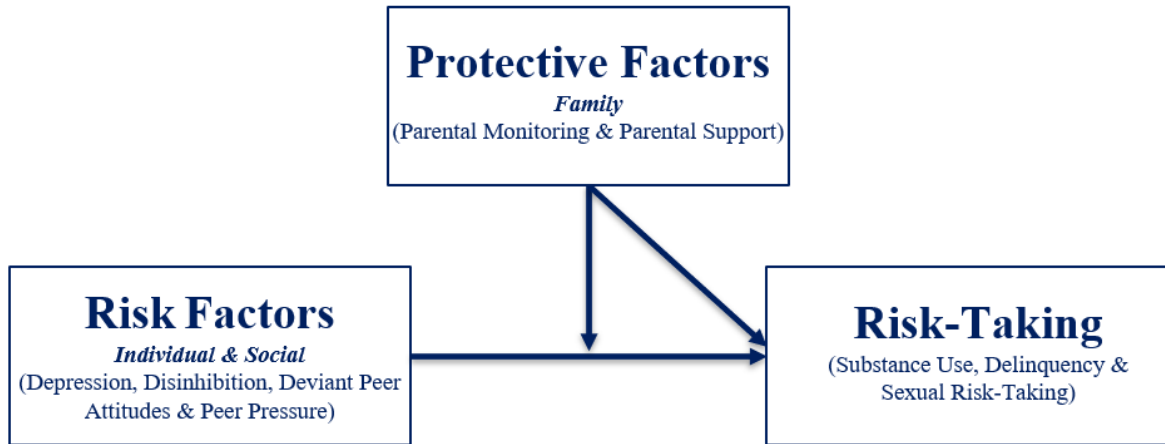
Parental support was measured using seven items from the support subscale of the Network of Relationships Inventory, with Mother/Father (Furman & Buhrmester, 1985). An example item is "How often does your mother/father support the things you do?", each question was measured on five point Likert Scale, ranging from 'little or not' to 'more is not possible'. Cronbach's alpha was $\alpha=.89$ for mother-child relationship and $\alpha=.83$ for father-child relationship, both indicating good reliability. If participants answered only one of the mother-child or father-child support measures, only this score was used, and if participants answered both, an average score was computed.

Strategy of Analysis

The present research used 'IBM SPSS Statistics 21' to conduct the analyses. A multiple regression was conducted to explore the first three hypotheses. All risk and protective factors were added as predictors, in combination with the covariates: gender, age, and W1 combined risk score and the dependent variable was W2 combined risk score. Next, following Hayes (2017) Second Model of Moderation (see Figure 1), the program PROCESS 4.1 was used on IBM-SPSS, to investigate the moderating effect of family protective factors on the association between risk factors and risk-taking behaviours. There were four independent variables; *depression*, *behavioural disinhibition*, *deviant peer attitudes* and *peer pressure*. The moderating variables were *parental monitoring* and *parental support*, and the outcome variable was W2 combined risk score.

Figure 1

Hayes (2017) Second Model of Moderation Applied to the Present Research



Results

Descriptive statistics and bivariate analyses

The means, standard deviations and intercorrelations for all independent, moderating and dependent variables are indicated in Table 1. The Pearson Correlation analysis revealed the risk factors *depression* and *disinhibition* had a negative correlation. Additionally, *peer pressure* had a negative correlation with; *depression* and *deviant peer attitudes*; and *parental monitoring*. Moreover, *W1 risk-taking* had a positive correlation with *depression* and *deviant peer attitudes* and a negative correlation with *peer pressure* and *parental monitoring*. Finally, *W2 risk-taking* had a positive correlation with *depression* and *W1 risk-taking*, and a negative correlation with *peer pressure*. The frequencies and distributions of participants' combined risk score are indicated in Table 2.

Table 1

Pearson Correlations, Mean and SD of Independent, Moderating and Dependent Variables

	1	2	3	4	5	6	7	8
1. Depression	-							
2. Disinhibition	-.42**	-						
3. Deviant peer att.	.11	.06	-					
4. Peer pressure	-.21**	-.00	-.26**	-				
5. P. monitoring	-.04	-.15*	-.26**	.28**	-			
6. P. support	-.08	.07	-.16**	.03	.26**	-		
7. Risk-taking W1	.19**	.05	.32**	-.27**	-.23**	-.03	-	
8. Risk-taking W2	.23**	.06	.07	-.18**	-.11	-.01	.48**	-
M	1.69	.568	2.52	.568	3.35	2.38	.265	.233
SD	.712	.902	.925	.902	.751	.819	.678	.693

*correlation significant at 0.05 level, **correlation significant at 0.01 level

Table 2*Frequencies and Distributions of Combined Risk-taking Scores at W1 and W2*

Combined risk score	W1 frequency %	W2 frequency %
0.00	313 (76.7%)	326 (79.9%)
1.00	51 (12.5%)	31 (7.6%)
2.00	22 (5.4%)	11 (2.7%)
3.00	14 (3.4%)	6 (1.5%)
4.00	3 (.7%)	3 (.7%)
5.00	0 (0%)	1 (.2%)
N	403	378

Association between risk and protective factors and risk-taking

To examine whether W1 individual and social risk factors, and protective factors would longitudinally predict W2 risk-taking, a multiple regression analysis was conducted. In the first step the covariates; *age*, *gender* and *W1 risk-taking* were entered as control variables. In step two, individual risk factors; *depression* and *disinhibition*, were entered, in step three social risk factors; *deviant peer attitudes* and *peer pressure* were entered and in step four protective factors *parental monitoring* and *parental support* were entered. The W2 combined risk-score was the dependent variable. The multiple regression met assumptions of linearity, collinearity, independent residuals (Durbin-Watson=1.90), homoscedasticity and there were no influential cases biasing the model. However the P-P Plot indicated the assumption of normal distribution was violated.

Analyses revealed 29% of the variance of W2 risk-taking ($R = 0.554$; Adjusted $R^2 = .297$) was explained by step 1; 32% of the variance ($R = 0.579$; Adjusted $R^2 = .320$) was explained by step 2; 34% of the variance ($R = 0.580$; Adjusted $R^2 = .336$) was explained by step 3; and 34% of the variance ($R = 0.583$; Adjusted $R^2 = .340$) was explained by step 4. The ANOVA indicated that step 1 ($p < .001$) and step 2 ($p = .011$) significantly predicted W2 risk-taking, however the change became non-significant at step 3 ($p = .965$) and step 4 ($p = .504$).

When assessing each variable independently; the three variables that significantly predicted W2 risk-taking were *W1 risk-taking* ($p<.001$), *depression* ($p=.006$) and *disinhibition* ($p=.026$). Gender, age, deviant peer attitudes, peer pressure, parental monitoring and parental support were not significant predictors of W2 risk-taking. Table 3 displays these results.

Table 3

Multiple Regression Analysis for Covariate, Risk and Protective Factors

Step	Predictors	<i>b</i>	SE	Beta	<i>t</i>	<i>p</i>
1	Gender	-.134	.089	-.087	-1.50	.136
	Age	-.004	.027	-.008	-.134	.893
	Risk-taking W1	.532	.058	.536	9.15	<.001***
2	Gender	-.125	.090	-.081	-1.40	.165
	Age	-.009	.027	-.081	-.322	.748
	Risk-taking W1	.481	.060	.484	8.03	<.001***
	Depression	.193	.069	.183	2.80	.006**
	Disinhibition	.220	.098	.144	2.25	.026*
3	Gender	-.129	.092	-.084	-1.40	.163
	Age	-.008	.027	-.018	-.306	.760
	Risk-taking W1	.481	.062	.484	7.78	<.001***
	Depression	.193	.071	.182	2.73	.007**
	Disinhibition	.219	.099	.143	2.22	.028*
	Deviant peer att.	-.011	.052	-.013	-.219	.827
	Peer pressure	-.009	.051	-.011	-.178	.859
4	Gender	-.137	.093	-.089	-1.47	.143
	Age	-.014	.028	-.029	-.481	.631
	Risk-taking W1	.481	.062	.485	7.77	<.001***
	Depression	.199	.071	.188	2.80	.006**
	Disinhibition	.238	.101	.156	2.37	.019*
	Deviant peer att.	-.014	.053	-.017	-.272	.786
	Peer pressure	-.022	.053	-.026	-.407	.684
	P. monitoring	.040	.065	.040	.619	.537
	P. support	-.065	.058	-.069	-1.12	.263

* $p<.05$, ** $p<.01$, *** $p<.001$

Protective factors' role in moderating

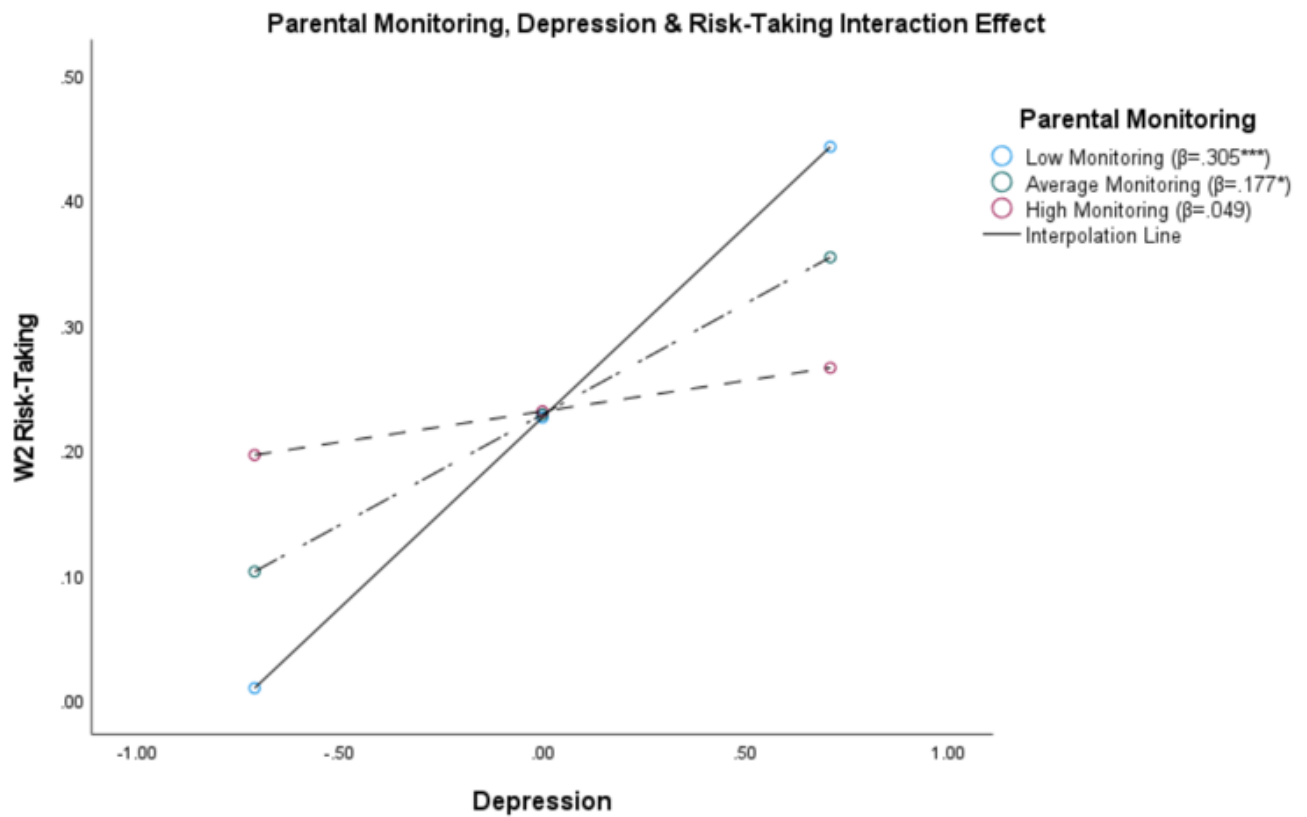
To investigate whether parental monitoring or support buffered the association between W1 risk factors and W2 risk-taking, Hayes PROCESS 4.1 (2017) Model 2 was used. Four analyses were completed examining whether *parental monitoring* or *support* moderated the association between *depression*, *disinhibition*, *deviant peer attitudes* or *peer pressure* and W2 *risk-taking*. No significant interactions emerged among *disinhibition*, *deviant peer attitudes* or *peer pressure* with either of the protective factors. Results did indicate however, that *parental monitoring* moderated the association between *depression* and W2 *risk-taking*, see Table 4. Decomposition of the interaction indicated *depression* was associated with risk-taking at low and average levels of *monitoring* ($\beta=.305$, $p<.001$ and $\beta=.177$, $p=.010$ respectively), but not at high levels of *monitoring* ($\beta=.049$, $p=.560$). The Johnson-Neyman analysis revealed the association between *depression* and W2 *risk-taking* was significant at values .208 SD below the mean, but became non-significant at values .208 SD above the mean. This significant interaction is illustrated in figure 2.

Table 4*The Coefficient and P Values of the Moderation Analyses*

Variables	Risk Factors							
	Depression		Disinhibition		Deviant Peer Att.		Peer Pressure	
	coefficient	p	coefficient	p	coefficient	p	coefficient	p
Gender	.184	.170	-.012	.193	-.137	.128	-.131	.144
Risk-taking W1	.482	<.001***	.476	<.001***	.474	<.001***	.479	<.001***
Depression	.177	.011*	.193	.007**	.199	.005**	.200	.005**
Disinhibition	.222	.024*	.242	.017*	.231	.020*	.236	.018*
<	.004	.929	-.014	.795	-.019	.710	-.020	.699
Peer pressure	-.026	.599	-.025	.640	-.025	.621	-.027	.604
Monitoring	.003	.958	.034	.606	.028	.653	.035	.578
Support	-.044	.432	-.070	.237	-.061	.274	-.060	.284
Risk factor x monitoring	-.170	.023*	-.009	.943	.022	.743	.019	.742
Risk factor x support	.030	.693	-.106	.237	.051	.457	.031	.644

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. The risk factors are independent variables, risk-taking W2 is the outcome variable, and the protective factors are moderating variables

Figure 2*Interaction Effect of Depression, W2 Risk-Taking and Parental Monitoring*

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. Simple slopes for the association between depression and W2 risk-taking computed at one standard deviation below the mean (low), the mean (average) and one standard deviation above the mean (high) of parental monitoring. This graph illustrates the association becomes non-significant when parental monitoring is high.

Discussion

The present study examined the role of risk factors in Caribbean adolescents' engagement in substance use, delinquency and sexual risk-taking. Previous researchers (Maharaj et al. 2009; Ohene et al., 2005; Pilgrim & Blum, 2012; Pozuelo et al., 2021; Ruprah et al., 2017; Unicef, 2020) posited these behaviours are of particular concern in the Caribbean and this research supports this, indicating over a fifth of participants engaged in at least one of these behaviours. The first purpose was to investigate whether individual risk factors (depression or disinhibition) were associated with risk-taking. Results indicated adolescents who experienced higher levels of depression or disinhibition, were significantly more likely to engage in risk-taking one year later. In relation to depression, these findings are consistent with previous research (Pilgrim & Blum, 2012; Pozuelo et al., 2021; Ruprah et al., 2017). With disinhibition, previous research has indicated disinhibition is associated with substance use and delinquency (Young et al., 2009; Zucker et al., 2011), however, to our knowledge this is the first study to provide evidence to support this, within a Caribbean sample.

The second purpose was to investigate whether social risk factors (deviant peer attitudes or peer pressure) were associated with risk-taking. Contrary to expectations, adolescents who had peers with deviant attitudes or experienced peer pressure, were no more likely to engage risk-taking. These opposed findings may be due to a number of reasons. Firstly, Mason et al. (2017) reported deviant peer attitudes were associated with risk-taking, however, this association was moderated by peer closeness, meaning adolescents who were less close with peers, were less influenced by deviant attitudes. The present study did not measure peer closeness, meaning this may have been a confounding variable. Secondly, the present research only investigated participants' injunctive norms when measuring deviant peer attitudes, whereas previous researchers (Pilgrim & Blum, 2012) investigated both injunctive and descriptive norms. Therefore, it may be necessary to measure deviant peer

attitudes by consulting peers directly, rather than solely relying on perceptions of peers' attitudes. Third, previous research (Albert & Steinberg, 2011; Mason et al., 2017; Pilgrim & Blum, 2012; Reynolds & Crea, 2015) employed a cross-sectional design, whereas the present research used a longitudinal approach. The present results revealed that deviant peer attitudes measured at W1 were correlated with W1 risk-taking, but not with W2 risk-taking. Therefore, deviant peer attitudes may have an association with immediate risk-taking, however, if deviant peer attitudes reduced by W2, then risk-taking one year later was not affected.

The third purpose was to investigate whether parental monitoring or support were associated with risk-taking, contrary to expectations, neither monitoring nor support were directly associated. These findings support the findings from Maguire and Fishbein (2016) which suggest risk factors have a stronger association with risk-taking in comparison to protective factors. These non-significant results may be due to a number of reasons, firstly, monitoring was measured using self-report measures, however previous research (Pilgrim & Blum, 2012) consulted both parent and child, so the present research may not have obtained accurate results. Second, for parental support: participants who completed the measures for both their mother and father received an average score across both parents. This means participants who had one highly supportive parent and another parent low in support, only received an average parental support score. Which may mean that parental support was calculated at a lower score than true (at least for one parent), meaning the effects of having one supportive parent may have been masked.

The fourth purpose was to investigate whether parental monitoring or support could buffer the association between individual risk factors and risk-taking. Results indicated that although monitoring was not directly associated with risk-taking, it did serve to buffer the association between depression and risk-taking. The interaction effect revealed if adolescents' experienced high parental monitoring, the association between depression and

risk-taking was non-significant. However, this association was not buffered by parental support, and in addition, neither parental monitoring nor support buffered the association between disinhibition and risk-taking. There are a number of possible reasons for the non-significant findings. First, the effects of one highly supportive parent may have been masked, as mentioned above, meaning parental support levels were not high enough to buffer. Second, although parental support can reduce adolescent depression (Bean et al., 2006; Grant et al., 2000), within a Caribbean sample there is an abundance of social factors which can negatively influence both parental and adolescent mental health (Brathwaite, 2009; Maguire & Fishbein, 2016), which may mean that although parental support is present, the parents may be experiencing mental health issues themselves and therefore jeopardising the effectiveness of their support (Grant et al., 2000). Third, Zucker et al. (2011) described that there are a number of other parental factors which can worsen adolescent disinhibition, such as parental drinking, which were not measured. Therefore, it is possible that adolescents and their parents were exposed to these other factors, so monitoring and support were not as effective in buffering the effects of disinhibition.

The fifth purpose was to investigate whether parental monitoring or support could buffer the association between social risk factors and risk-taking. Contrary to our predictions, neither monitoring nor support buffered the association between deviant peer attitudes and risk-taking or peer pressure and risk-taking. There are a number of possible reasons for these non-significant findings. As mentioned above, it may be due to how peer attitudes were measured and also due to the longitudinal design. Additionally, Albert and Steinberg (2011) highlighted that adolescence is a period where peers often have more influence on behaviour than parents, so this may be why neither parental monitoring nor support could buffer the effects of peers. Finally, previous researchers (Brathwaite, 2009; Maguire & Fishbein, 2016; Ruprah et al., 2017) reported that there are significant social issues among Caribbean youth

presently, so parental monitoring and support alone, may not be enough to buffer the effects of these social risk factors.

Furthermore, there are a number of additional interesting findings. First, as expected, adolescents who engaged in risk-taking were significantly more likely to engage in risk-taking one year later. Second, depression and disinhibition were negatively correlated, indicating that adolescents typically did not experience both of these risk factors at one time. Third, both gender and age did not play a significant role in adolescents' risk-taking which contrasts previous findings (Pilgrim & Blum, 2012; Pozuelo et al., 2021; Ruprah et al., 2017), however, this may be due to risk behaviours being grouped together, as previous research reported on gender differences for individual risk behaviours.

Strengths and Limitations

There are a number of strengths in this research. Firstly, the longitudinal design controlled for prior levels of risk-taking and is the first step in a causal analysis by indicating variation in the risk and protective factors preceded variation in W2 risk-taking. Secondly, this is one of only three studies, to our knowledge, to investigate the moderating role of protective factors in the association between risk factors and risk-taking within a Caribbean sample. Third, although there was a drop-out bias for participants who experienced low parental monitoring, a significant effect was still observed, indicating the measure for monitoring was valid.

Additionally, there were also three main limitations. Firstly, there was low reliability on the sexual risk-taking and disinhibition measures. Second, all measures were self-report, meaning the results may be biased due to social desirability or selective recall. Third, risk factors were grouped according to The Problem Behaviour Theory (Jessor, 1987), however, as Maharaj et al. (2009) reported, some risk factors were only linked to specific behaviours,

e.g. social risk factors were associated with delinquency but not substance abuse, so the grouping of all behaviours may have resulted in non-significant findings.

Theoretical and Practical Implications

In conclusion, this research contributes to the existing literature on the role of risk and protective factors among Caribbean adolescents' risk-taking. Existing research has largely focused on risk and protective factors independently (Maharaj et al., 2009; Pozuelo et al., 2021; Ruprah et al., 2017), however, the present research analysed the two together, and findings indicated risk factors have a stronger effect on risk-taking, specifically individual risk factors: depression and disinhibition. Additionally, although parental monitoring was not directly associated with risk-taking, it was able to buffer the relationship between depression and risk-taking. Improving our understanding of the buffering effects of protective factors is essential for a number of reasons. For example, in many cases, a risk factor can be static or historical (history of abuse) or difficult to change (deviant peers), so intervention programmes may be more likely to succeed if they add protective factors, rather than attempting to remove stubborn risk factors. Therefore, this kind of research provides evidence on which protective factors may be most suitable to add into interventions, depending on the risk factors present in the adolescent's life.

The theoretical implications of these findings is that Caribbean adolescents who experience depression or behavioural disinhibition, are at increased risk of risk-taking. Additionally, if parental monitoring is high, adolescents who experience depression are no more likely to engage in risk-taking in comparison to their non-depressed peers. The practical implications is that intervention programmes for adolescents living with depression and other mental health issues, should not only target the individual, but should also have a parent-training component which focuses on increasing monitoring, to reduce risk-taking. Additionally, based on the longitudinal findings, prevention programmes which target

younger adolescents displaying signs of behavioural disinhibition may be effective in reducing risk-taking later in life. Considered together, this research provides valuable and contemporary data on a Caribbean sample of adolescents, which should contribute to the future development of support programmes for these youths.

Ethics Statement

This research was conducted in line with the ethical policies and procedures in place at the Faculty of Social and Behavioural Sciences, Utrecht University. Standardized questionnaires were used which were considered unlikely to inflict physical or emotional risk for the participants. All participants' parents gave passive informed consent for their child's participation in the research and all participants were informed that they could withdraw at any time.

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