

# The Explanation of Adolescents' Delinquent Behaviors Based on Jessor's Problem Behavior Theory (PBT) in Iran: The Role of Individual Vulnerability, Opportunity Risk Availability, and Perceived Support

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## Research Article

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## Abstract

**Background:** This study tested the generality of Problem Behavior Theory (PBT) in explaining adolescents' problem behavior in Iran.

**Methods:** Data were collected from 392 adolescents ( $M_{\text{age}} = 15.97$ ,  $SD = 1.12$ , 55.4% girls) who completed the Adolescent Health and Development Questionnaire (AHDQ) to assess the individual vulnerability, opportunity risk availability, perceived support, and delinquent behaviors.

**Results:** Results indicated that individual vulnerability and opportunity risk availability had a significant relationship with delinquent behaviors and a significant interaction with perceived support in their influence on delinquent behaviors. Further, perceived support was negatively associated with delinquent behaviors.

**Conclusions:** Our results were consistent with PBT's explanatory model for adolescents' problem behavior in Western countries and are informative about problem behavior involvement among Iranian adolescents and the design of interventions.

## Background

Delinquent behavior refers to an action the commitment of which confronts the offender to the laws of the civil society (1). Some of the delinquent behaviors include theft, property damage, physical aggression, selling drugs, burglary, robbery, vandalism, and avoiding school (2), which could lead to poor educational performance, school absenteeism (3), escape from home (4), substance use, depression/anxiety, self-harm (5), and even increased probability of unnatural death caused by suicide, murder, and alcohol abuse (6, 7). Even though the problem behaviors rate has declined in some countries (e.g., the United States) (8), it is still among the widespread risk behaviors in many societies (9–11).

A broad range of behavioral problems such as antisocial behavior (12), drug use (13), and alcohol consumption (14) appears during adolescents. In the same vein, some records show that engagement in antisocial behavior comes to a climax from mid-to-late-adolescence years (15). For example, 1,154,096 youths were put in jail in the US in 2010 (15). In addition, a study indicated that among 50 percent of twelfth-grade students had used illegal substances during their lifespan, 70% had drunk alcohol, and 19% smoked currently (14). Further, several studies examined problem behaviors among adolescents in Iran, which were primarily epidemiological (e.g., 16, 17, 18). For instance, Rashid (18) studied the prevalence of problem behaviors among adolescents in Iran; results indicated that hookah smoking (51.5%), cigarette smoking (35.2%), beating outside the house (except school) (28.1%), and drinking (27.4%) were respectively the most common problem behaviors among adolescents. A high frequency of engagement in problem behavior may lead to some inconvenience. For example, adolescents involved in problem behaviors are more likely to have problems in different areas, such as lower psychosocial adaptation or physical health, poorer life expectations, and a difficult transition into adulthood (19). Adolescent problem behaviors may also result in long-term developmental problems, continuing to adulthood, though these behaviors may not become chronic for most of them (20).

Several theories have been developed to explain delinquency in adolescents, including General Strain Theory (21, 22), Object Relations Theory (23), Interactional Theory (24), Developmental Theory (25), Social Control Theory (26, 27), Social Learning Theory (28), Social Development Model (29), and Problem Behavior Theory (30).

PBT that is the main focus of the current study, is one of the most comprehensive theories regarding the etiology of problem behaviors. PBT is a social-psychological framework that explains the association between psychosocial protective and risk factors and involvement in problem behaviors (e.g., delinquent behavior, substance use, problem drinking, and early sexual intercourse) (31). According to PBT, problem behaviors result from the interaction between risk factors such as opportunity risk availability (e.g., exposure to risk opportunities, such as gang membership) and individual vulnerability (e.g., individual-level features, such as stress, depression, low self-esteem, or perceived hindered access to the achievement of a prosperous life) and protective factors (e.g., the support given by friends, teachers, and neighbors) (32). While risk factors increase the likelihood of involvement in risk behaviors (e.g., providing a model for problematic behavior and rising possibilities of involvement in risk behaviors), protective factors diminish the chance of engagement in risk behaviors (e.g., presenting a pattern of prosocial behaviors, social and personal supervision and control, and supportive social environment). In addition, the simultaneous presence of more risk factors and less protective factors increases the likelihood of the adolescent's involvement in problem behaviors (Figure 1) (33, 34).

In the last decades, studies were conducted in various countries to examine the generality of the explanatory model of adolescents' problem behavior based on PBT. The significant merit of such studies is to test the adequacy of an explanatory model, which can be used in different societies (35). An explanatory model's generality across different nations accentuates their dynamic or genotype commonality than phenotypic differences (36). For example, despite a significant difference between the United States and the Republic of China in the social, political, and economic system, Jessor et al. (34) showed that problem behavior is significantly influenced by the same protective and risk factors in both countries and for both genders. Also, Vazsonyi et al. (37) supported the similarities in PBT's explanation of problem behavior in Asian, Eastern, Western European, North American, and Eurasian/Muslim cultures. Thus, the results of these studies make a convincing case for the idea that the explanatory model of PBT has, to a large extent, cross-national generality.

Notwithstanding, there are remarkable differences in culture and educational system between Iran and the countries where PBT has been shown to have generality (specifically Western countries) (38–43). Eastern cultures encourage low arousal emotions, which is in contrast to Western cultures (44); the restriction of emotional expression in Eastern cultures might account for the higher levels of callous-unemotional traits in Asian children compared to children in the United States (45, 46). Additionally, in Iran, the educational system is under the influence of traditional and religious conventions. Iran is one of the rare countries where the Shi'ism stance about ethics like gender segregation is widely used in educational institutions. Further, Islamic values have a considerable impact on adolescents' behavior in Iran. For instance, these norms have limited opportunities to establish relations with the opposite sex (47, 48). In Iran, traditional ethics restrict individuals' independent decision makings, and authority figures like parents, teachers, and elders play an essential role in youngsters' critical decisions (e.g., marrying, buying a house, and choosing a career), so adolescents' behaviors are more influenced by authority figures who encourage them toward prosocial behaviors (48, 49).

On the other hand, in recent years, because of the rapid widening of technology in Iran, most adolescents are getting familiar with Western cultures and imitate them, which is in contrast with their parents' system of beliefs and values. Thus, adolescents experience more conflict with their parents and may experience parental rejection and deprivation from vital support sources. Furthermore, compared to other countries such as the United States and the Republic of China, Iran is a low-income country, and Iranians have been suffering from more severe economic hardship, a factor that increases the rate of crime and delinquent behaviors (50). Financial hardship leads parents to withstand significant distress, and it disrupts the parent-adolescent relationship. As a result, parents lose their control over adolescents' behavior that might increase the risk of adolescents' engagement in problem behaviors (Gutman et al.51). Finally, in contrast to individualistic societies such as Western countries, where seeking help is considered a weakness and a disruption to others, in collectivistic nations like Iran, seeking support and expression of feeling are more acceptable (52). Therefore, considering these significant differences in cultural, social, and religious aspects between Iran and other countries, a theory from a different culture cannot be generalized to Iran, and a separate study is needed to test the generality of PBT as an explanation of delinquent behaviors of adolescents in Iran.

Still, to our knowledge, in Iran, no study has employed an integrative theory-based psychosocial model to comprehensively examine problem behaviors among adolescents. Therefore, the current study is designed to examine if the explanatory model for problem behavior involvement (i.e., PBT) accounts similarly for Iranian adolescents' problem behaviors. In this vein, we first explore whether risk factors (i.e., individual vulnerability and opportunity risk availability) in each of the four social contexts (i.e., family, peers, school, and neighborhood) explain delinquent behavior; then, we will examine whether support moderates the influence of risk factors on delinquent behavior. Specifically, based on PBT theory, it is hypothesized that delinquent behaviors would be positively related to individual vulnerability and opportunity risk availability and negatively associated with perceived support.

## Method

### Participants and Procedure

The present study was first evaluated and confirmed by the ethics committee of the Iran University of Medical Sciences (IUMS) (code number: IR.IUMS.REC.1397.1254). Participants were 392 students aged 13 to 18 years old ( $M_{age} = 15.97$ ,  $SD = 1.12$ ; 55.4% girls) in grades 10 (25.5%), 11 (19.1%), 12 (44.9%), and were recruited from four high schools in Tehran (two girl high schools and two boy high schools) through a convenience sampling method. Students, their parents, and teachers were informed regarding the survey administration. Students were surveyed except when they refused to participate or when their parents objected. The administration of the survey was conducted in the classroom on a regular school day. Before beginning the assessment, the students were informed again about the confidentiality of the information and signed the consent form. They were asked to complete the questionnaire in their classroom during a one-hour session under the supervision of a specially trained research assistant (master-level student). Students could ask the supervisor for clarification if they did not understand any question. The participants were also asked to write down their e-mail addresses should they want to receive the result of their completed questionnaire. We distributed the questionnaires to 433 students, and 392 completed questionnaires (response rate of 90%) were recruited. Participants' mothers' education was reported as housekeeper (83.7%) and employed (16.3%); fathers were jobless (1.3%) or employed (98.7%).

## Measures

### Adolescent Health and Development Questionnaire (AHDQ)

AHDQ (53) is a self-report tool developed based on problem behavior theory. It measures the personality systems, perceived environment systems, and behavior system and structures shaping these systems. AHDQ includes 335 items, which measures problem behaviors, as well as the adolescent's perceptions concerning their relationships with parents, peers, school, neighborhood, and demographic features. The AHDQ includes six domains, but we administered only three of the domains in this study, which include opportunity risk and vulnerability risk (predicting variable), perceived support (moderator variable), and delinquent behaviors (dependent variable). Opportunity risk includes two subscales (i.e., availability (4 items), and gang (2 items)); vulnerability risk consists of five subscales (i.e., felt stress (3 items), felt depression (3 items), low expectations for success (9 items), low expectations for school achievement (7 items), and low self-esteem (6 items)); perceived support includes four subscales

(i.e., family support (7 items), peers support (4 items), school support (4 items), and neighborhood support (3 items)); finally, delinquent behaviors includes 10 items. Items scores are summed up to yield the subscales scores.

There are some example for the items of the subscales as follow: availability (*If you wanted some cigarettes to smoke, would you be able to get some at home?*), gang (*Do any of the kids in your neighborhood belong to gangs?*), felt stress (*Is there tension or stress at home in your family?*), felt depression (*In the past six months, have you just felt really down about things?*), low expectations for success (*What are the chances that you will graduate from high school?*), low expectations for school achievement (*How sure are you that you will get at least a B average this year?*), low self-esteem (*What about your ability to do well in school work?*), family support (*Are your parents interested in what you think and how you feel?*), peers support (*Are your friends interested in what you think and how you feel?*), school support (*Do teachers at your school treat students with respect?*), neighborhood support (*Are people friendly to each other when they meet?*), and delinquent behavior (*During the past six months, how often have you cheated on tests or homework?*).

Mehdizadeh (54) validated the Persian version of the AHDQ with a sample of 1860 students in Tehran. The results indicated that each of the subscales of individual vulnerability, opportunity risk availability, protective support, and delinquent behaviors domains had almost acceptable internal consistency. The Cronbach's alpha coefficient in both Iranian (54) and US (53) studies were as followed: felt stress (Iran: .75, US: .76), felt depression (Iran: .65, US: .86), low expectation for success (Iran: .86, US: .90), low expectations for school achievement (Iran: .72, US: .80), low self-esteem (Iran: .68, US: .65), availability of cigarettes and alcohol in family and neighborhood environment (Iran: .86, US: .87), opportunity risk gangs (Iran: .69, US: .81), accessibility to family support (Iran: .81, US: .86), friends support (Iran: .50, US: .78), teacher support (Iran .63, US: .83), neighborhood support (Iran: .66, US: .86), and delinquent behavior (Iran: .86, US: .84).

## Data Analysis

First, in the data screening process, to include as many cases as possible, missing values were examined using the series mean method in SPSS 20; also, we used the Boxplot method to deal with outliers. In the present study, SPSS 20 software was used for data entry and statistical analyses. Descriptive information for variables used in the current study was calculated and presented in Table 1. Data were analyzed using Pearson correlation coefficient and hierarchical multiple regression analysis. For hypothesis testing, we considered  $p = .05$  as indicating statistically significant results.

Table 1  
Internal Consistency Coefficients, Means, Standard Deviations, and Pearson Correlations among Individual Vulnerability and Opportunity and Support with Delinquent Behaviors

Variable	Descriptive Statistic				Correlations											
	M	SD	$\alpha$	MIC	1	2	3	4	5	6	7	8	9	10	11	
1 Felt stress	8.04	2.55	.72	.46												
2 Felt depression	7.60	2.60	.83	.45	.48**											
3 Low expectations for success	12.38	4.46	.61	.43	.09	.25**										
4 Low expectations for school achievement	7.96	2.71	.20	.36	.09	.15**	.38**									
5 Low self-esteem	10.88	2.71	.34	.18	.12*	.27**	.32**	.38**								
6 Opportunity risk (availability)	6.28	2.42	.81	.32	.14**	.09	.09	.16**	.25**							
7 Opportunity risk (gangs)	3.49	1.53	.83	.47	.15**	.07	.01	.10*	.19**	.36**						
8 Family support	21.74	4.25	.84	.35	-.36**	-.35**	-.22**	-.22**	-.33**	-.27**	-.22**					
9 Friends support	3.81	98.	.56	.24	.014	.11*	-.01	-.13**	-.19**	-.00	-.07	.10*				
10 Teacher support	10.54	3.09	.84	.40	-.17**	-.14**	-.10*	-.15**	-.23**	-.22**	-.09	.32**	.12*			
11 Neighborhood support	8.07	2.37	.84	.47	-.19**	-.19**	-.07	-.15**	-.30**	-.20**	-.06	.31**	.09	.32**		
12 Delinquent behavior	18.64	6.26	.78	.28	.16**	.17**	.21**	.36**	.41**	.51**	.41**	-.39**	-.12*	-.31**	-.26**	

*Note.* M=Mean, SD=Standard Deviation,  $\alpha$ = alpha, MIC= Mean Inter-item Correlation, \* $p < 0.05$ , \*\* $p < 0.01$

## Results

First, Pearson's correlation were calculated between all study variables. Results indicated that delinquent behavior had a significant positive correlation with individual vulnerability variables consisting of felt stress ( $r = .16, p < .01$ ), felt depression ( $r = .17, p < .01$ ), low expectation for success ( $r = .21, p < .01$ ), low expectations for school achievement ( $r = .36, p < .01$ ), and low self-esteem ( $r = .41, p < .01$ ). Furthermore, delinquent behavior was positively associated with opportunity risk availability variables, including cigarettes and alcohol at home ( $r = .51, p < .01$ ) and access to gangs ( $r = .41, p < .01$ ). Associations between delinquent behaviors and family support ( $r = .39, p < .01$ ), friends support ( $r = .12, p < .05$ ), teacher supports ( $r = .31, p < .01$ ), and neighborhood support ( $r = .26, p < .01$ ) were also statistically significant consistent with hypothesized directions (Table 1).

In the present research, our first aim was to test the effect of individual vulnerability (i.e., felt stress, felt depression, low expectation for success, low expectations for school achievement, and low self-esteem) on adolescents' delinquent behaviors. We were also interested in testing whether individual vulnerability interacts with support in its effect on adolescents' delinquent behavior. To test these hypotheses, we used hierarchical multiple linear regression; we entered individual vulnerability variables in the first block, support variables were entered in the second block, and the cross-product variable (individual vulnerability x support) was entered in the third block. The results indicated that, in the first step, individual vulnerability variables explained a statistically significant portion of explained variance ( $\text{adj } R^2 = .22, F[5, 385] = 22.97, p < .001$ ). Similarly, in the second step, the support variables resulted in a statistically significant increase in  $\text{adj } R^2$  ( $\text{adj } R^2 = .29, F[9, 381] = 18.40, p < .001$ ). Finally, in the third step, the cross-product variable (individual vulnerability x support) explained a statistically significant increase in variance explained ( $\text{adj } R^2 = .33, F[29, 361] = 7.58, p = .001$ ). Among the analyzed variables, low expectations for school achievement ( $\beta = 1.01, p < .001$ ), low self-esteem ( $\beta = .75, p < .01$ ), the interaction between low expectation for success and friends' support ( $\beta = -.55, p < .02$ ), and interaction between low expectation for success and teacher's support ( $\beta = .53, p < .02$ ) had a statistically significant influence on delinquent behaviors (Table 2).

**Table 2.** Results of hierarchical multiple linear regression analyses for individual vulnerability and support and interaction between these variables in their effects on delinquent behaviors (n = 392)

Predictor variables	Regression 1	Regression 2	Regression 3
Felt stress	.10 (.05*)		
Felt depression	.001(.98)		
Low expectations for success	.02 (.73)		
Low expectations for school achievement	.23(.001**)		
Low self-esteem	.31(.001**)		
Family support		-.21 (.001**)	
Friends support		-.001 (.93)	
Teacher support		-.14 (.001**)	
Neighborhood support		-.05 (.28)	
Felt stress x Family support protection			-.02 (.92)
Felt Depression x Family support protection			.35 (.23)
Low expectations for success x Family support protection			-.10 (.70)
Low expectations for school achievement x Family support protection			-.36 (.19)
Low self-esteem x Family support protection			-.29 (.25)
Felt stress x Peer support protection			.05 (.81)
Felt depression x Peer support protection			.05 (.83)
Low expectations for success x Peer support protection			-.53 (.02*)
Low expectations for school achievement x Peer support			.04 (.83)
Low self-esteem x Peer support protection			-.30 (.18)
Felt stress x Teacher support protection			.17 (.44)
Felt depression x Teacher support protection			-.04 (.85)
Low expectations for success x Teacher support protection			.55 (.01*)
Low expectations for school achievement x Teacher support protection			-.30 (.15)
Low self-esteem x Teacher support protection			-.30 (.19)
Felt stress x Neighbors support protection			-.28 (.20)
Felt Depression x Neighbors support protection			.15 (.49)
Low expectations for success x Neighbors support protection			.08 (.67)
Low expectations for school achievement x Neighbors support protection			-.33 (.14)
Low self-esteem x Neighbors support protection			.08 (.73)
R <sup>2</sup>	.23**	.30**	.39**
adj R <sup>2</sup>	.22**	.29**	.33**
F	22.97	18.40	7.94

Notes.  $\beta$  = standardized regression coefficient; SE = standard error; \*\* $p < .01$ ; \* $p < .05$

Our second purpose was to determine the effect of opportunity risk availability variables (i.e., opportunity risk availability and opportunity risk gangs) on adolescents' delinquent behaviors and to test whether these variables interact with support in their influence on delinquent behavior. Using hierarchical multiple linear regression, we entered availability variables at the first block, support variables at the second block, and the cross-product variable (availability x support) in the third block. Results of hierarchical multiple linear regression confirmed our hypotheses. In the first

step, availability variables explained a statistically significant portion of explained variance (adj  $R^2 = .32$ ,  $F [2, 388] = 91.94$ ,  $p < .001$ ). Likewise, in the second step, the support variables increased  $R^2$ , which was statistically significant (adj  $R^2 = .39$ ,  $F [6, 384] = 43.41$ ,  $p < .001$ ). In the third step, the cross-product variable (availability x support) explained a statistically significant increase in the variance of delinquent behaviors (adj  $R^2 = .45$ ,  $F [14, 376] = 24.16$ ,  $p = .001$ ). Thus, the interaction was statistically significant. Our findings indicated that access to gangs ( $\beta = 1.31$ ,  $p < .001$ ), the interaction between access to gangs and family support ( $\beta = -.94$ ,  $p < .001$ ), opportunity risk availability ( $\beta = .71$ ,  $p < .001$ ), and family support ( $\beta = .26$ ,  $p < .03$ ) have a statistically significant effect on adolescents' delinquent behaviors. Also, the higher beta coefficient of the access to gangs ( $\beta = 1.31$ ) indicates that this component is a better predictor of delinquent behaviors than other variables (Table 3).

**Table 3.** Results of hierarchical multiple linear regression analyses for availability and support and interaction between these variables in their effects on delinquent behaviors (n = 392)

Predictor variables	Regression 1	Regression 2	Regression 3
Opportunity risk availability	.42 (.001 <sup>**</sup> )		
Opportunity risk gangs	.26 (.001 <sup>**</sup> )		
Family support		-.19 (.001 <sup>**</sup> )	
Friends support		-.06 (.11)	
Teacher support		-.11 (.01 <sup>*</sup> )	
Neighborhood support		-.07 (.09)	
Opportunity risk availability x Family support			.01 (.93)
Opportunity risk gangs x Family support			-.93 (.001 <sup>**</sup> )
Opportunity risk availability x Friends support			-.28 (.19)
Opportunity risk gangs x Friends support			-.03 (.86)
Opportunity risk availability x Teacher support			-.21 (.24)
Opportunity risk gangs x Teacher support			.12 (.51)
Opportunity risk availability x Neighborhood support			-.03 (.88)
Opportunity risk gangs x Neighborhood support			-.29 (.14)
R <sup>2</sup>	.32 <sup>**</sup>	.40 <sup>**</sup>	.47 <sup>**</sup>
adj R <sup>2</sup>	.31	.39	.45
F	91.94	43.40	25.76

Note.  $\beta$  = standardized regression coefficient; SE = standard error; <sup>\*\*</sup> $p < .01$ ; <sup>\*</sup> $p < .05$

## Discussion

In the current study, we aimed to test the generality of PBT in Iranian culture by examining the relationship between individual vulnerability and opportunity risk availability with delinquent behaviors, considering the moderating role of support.

We found a significant positive relationship between delinquent behavior and individual vulnerability (i.e., felt stress, depression, low expectation for success, low expectations for school achievement, and low self-esteem). Our finding is consistent with previous studies (e.g., 55, 56). For instance, Chen et al. (57) found that differences in delinquency between adolescents with community violence exposure experience versus those without such experiences were smaller when youth reported high levels of future expectations compared to those reporting low levels, implying the critical role of future expectations in youth. Also, consistent with our results denoting the significant effect of low expectation on youth delinquency, an assumption has been proposed by prior researchers, suggesting that proximal factors, such as future or success expectation versus distal factors, have a more significant influence on resiliency (58, 59). Similarly, to predict delinquent behaviors in youth, some researchers have found that among all of the protective factors, only future expectations interacted with community violence and risk availability, suggesting that the relationship between risk availability and delinquent behaviors is influenced by expectations for the future (57, 60, 61). Also, most studies indicated that youth with a more optimistic view of success and future are less likely to be involved in delinquent behaviors, a hypothesis that has been supported in empirical research (60, 61).

Moreover, our results indicated that high levels of low expectations for success mitigate the positive influence of teacher support on adolescent delinquency. Therefore, teachers fail to have a buffering effect on the relationship between individual vulnerability and delinquency. Also, given increased stress levels stemming from the immense biological and social changes occurring during the adolescence period, the rate of delinquent behaviors increases in adolescents (62). Likewise, adolescents are much more likely to react to environmental influences considering the uncertainty with new expectations and social life (63). Moreover, these findings are consistent with previous work, which has underscored the essential roles of school and family in developing child competency (64, 65). Consistent with prior work (e.g., 66), our findings document that family support and teacher support are associated with lower levels of delinquent behaviors in adolescents. In the same vein, social control theory establishes a framework for the selection of family, school, and neighborhood contexts to represent protective factors from other contexts. Accordingly, adolescents who are strongly affected by prosocial agents presented by school and parental figures would be more encouraged to stick to conventional behavior, and therefore less likely to engage in delinquency (27). Importantly, during adolescence, individuals become autonomous and begin to individuate (67, 68), so they decrease communication with parents (69). Nonetheless, communication is an essential means for attaining and reinforcing intimacy and closeness, so to satisfy their needs for being independent and to enhance relatedness at the same time, adolescents seek means of communication with those who acknowledge their needs, such as peers, teachers, and neighbors (70). Therefore, when they spend time with other people, especially peers, parents are not available to keep watch over their activities (71). As a result, adolescents may grasp an opportunity to engage in delinquencies (e.g., shoplifting and vandalism) (71, 72).

Additionally, the present study indicated the stronger effects of peer support and low expectation for success on adolescent delinquency than other support variables. Moreover, individual factors such as those associated with vulnerability (e.g., felt stress and low expectation for success) were the main factors leading to a friendship with deviant peers who have problem behaviors (Jessor 73). Such friendships intensify negative intrapersonal emotions and increase the frequency of delinquent behaviors (Wang et al. 74).

Also, in line with previous studies (e.g., 75, 76-78), our results indicated a significant positive relationship between opportunity risk availability and delinquent behaviors. According to Social Ecology Model (78) and Problem Behavior Theory (Jessor 79), involvement in gang activities increase the risk of delinquent behaviors, through which gangs provide the opportunity for delinquencies and also recruit youth already at a high risk of problem behaviors (80). Importantly, when interactions between all protective factors and opportunity risk availability were examined simultaneously, our findings support a moderating effect of family support on the relationship between risk availability and youth delinquency. In line with our results, Kliewer et al. (81) indicated that community violence exposure and risk availability were more strongly correlated with externalizing behaviors among youths who reported higher amounts of caregiver emotion regulation (family influence). Conversely, children's emotion regulation and neighborhood influence did not moderate the relationship between risk availability and externalizing behaviors. In the same vein, Kliewer et al. (81) found that taking part in extracurricular activities and positive parent-child relationships decrease the risk effect of risk availability on externalizing behaviors. Some studies (e.g., 82) found that positive psychosocial and environmental factors can function as protective factors that buffer the adverse effects of low expectations on youth outcomes. Similarly, several studies (e.g., 57, 83, 84) have supported the buffering effects of protective factors on the relationship between risk availability and problem behaviors, with associations among risk availability and adolescent problem behaviors weakening at a higher level of protective factors, such as family support. Previous research results have shown that if adolescents enjoy emotional support from their parents and have positive and useful experiences in the family (as the primary social institute), they will be secure against risk factors in social environments like the neighborhood and community (e.g., 78). Similarly, Keyzers et al. (85) indicated that emotional connections and a good relationship with parents within a secure attachment style are associated with low problem behaviors. Indeed, positive social relationships were reported by adolescents who reflected clear rules and limits in the family, rewards for positive behaviors, parental control over children's behavior, and lack of family conflicts and tensions (86). Specifically, our findings indicated that the association between risk availability and youth delinquency did not vary as a function of protective factors measured at the school, neighborhood, and peer levels, while teacher support was directly associated with lower levels of delinquency. The different figure of results observed for protective factors from different social contexts suggests the inconsistencies may partly be due to cultural differences or the type of protective factor evaluated.

While the findings of the present study can be informative, it should be considered that this study was conducted on high school students who participated in research with their consent. Since this study was done in school, dropped out and fired adolescents, worker youth, imprisoned adolescents, etc., were not considered in the study sample; hence, the obtained results cannot be generalized to all adolescents. In fact, these adolescents may experience a different mechanism of delinquency, which cannot be considered in the study sample of the current study and should be studied in a separate study. Additionally, the self-report method of assessing the adolescent problem behaviors and this method's weaknesses, which in the current research could be the adolescents' sensitivity to some questions concerning delinquency, smoking, and alcohol use, may lead to a lack of honesty in responses given to the questions. Moreover, the other limitation is that due to the low sample size, the analyses were not conducted separately for boys and girls. Despite these limits, the findings of the present research indicated valuable information concerning the relationship between individual vulnerability, support, and delinquent behaviors. The findings of our study can contribute to correct planning and scientific interventions to prevent delinquent behaviors; studies should be done to investigate the longitudinal and qualitative aspects of these plans and interventions. Also, future studies can expand the findings of the present study by considering behavioral brain systems and the brain's arousal levels to find a clearer image of the relationship between individual vulnerability, support, and delinquent behaviors.

## Conclusions

In conclusion, our results suggest that adolescents' involvement in problem behavior in different cultures is independent of where they live and is under the influence of the same individual and social factors (87). Our results add to the sparse literature on problem behavior among adolescents of low industrial and low economic countries like Iran. Also, the significant interactions or moderating effects in this study provide further support for PBT's usefulness and are noteworthy because of the well-known difficulty of demonstrating interaction effects in field studies (88). Furthermore, the results of the present study support the theoretical concepts of PBT and the generality of the PBT explanatory model (89) in Iran. Our results are consistent with previous studies in different cultures such as China, the United States (34), Kenya (Ndugwa et al., 2011), Hungary, Netherlands, Slovenia, Spain, Switzerland, Taiwan, and Turkey (Vazsonyi et al., 2010), which tested the generality of PBT.

## Declarations

### Ethics approval and consent to participate

The ethics committee of the Iran University of Medical Sciences first approved this study (code number IR.IUMS.REC.1397.1254). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was further reviewed and approved by schools' boards. All participants provided informed consent after explaining the study purpose and assuring confidentiality. Also, informed consent to participate in the study was obtained from participants' parent or legal guardian (in the case of children under 16).

### Consent for publication

Not applicable

### Availability of data and materials

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation..

### Competing interests

The authors have no conflict of interest to declare

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### Authors' contributions

Conceptualization, M.D., M.K.A.V., E.T.C., and M.H.A.; methodology, M.D., E.T.C., and M.H.A.; software, M.D. and M.E.A.; formal analysis, M.D., M.E.A., and M.H.A.; investigation, M.D.; resources, M.H.A.; data curation, M.D., and M.E.A.; writing—original draft preparation, M.D. and M.H.A. writing, review and editing, M.D., M.E.A., E.T.C., M.K.A.V., and M.H.A.; visualization, M.D., E.T.C. and M.H.A.; supervision, M.H.A.; project administration, M.H.A.; All authors have read and agreed to the published version of the manuscript.

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## Figures

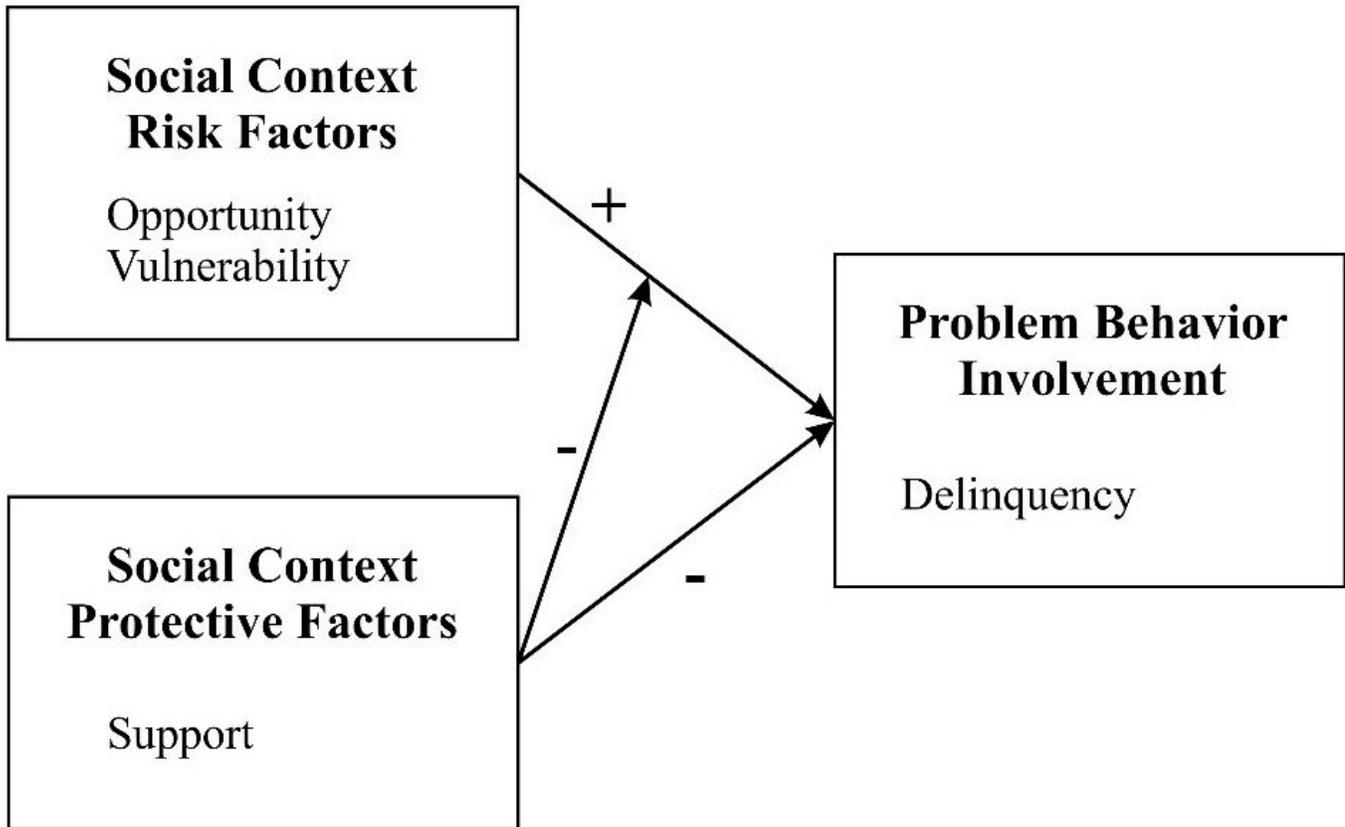


Figure 1

The protection-risk model of social context and adolescent problem behavior involvement (34). The "+" and "-" signs indicate a positive or negative impact on problem behavior involvement.