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The Relationship of Individual and Contextual Risk Factors with Social-Emotional Health among Iranian Residential Foster Care Adolescents

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The present study investigated risk and resilience processes in a sample of residential foster care Iranian adolescents. Based on Jessor's (1998) Problem Behavior Theory, the risk factors comprised theoretically derived composite indices computed for three kinds of risk: models risk, opportunity risk and vulnerability risk at the individual and at four contextual levels: the foster home, peers, school and the neighborhood. For this purpose, adolescent girls (n = 69) and boys (n = 71) living in eight residential foster homes in the city of Tehran, responded to an adapted version of the Adolescent Health and Development Questionnaire, Jessor, 1998) and their caregivers rated the adolescents' mental health with the Strengths and Difficulties Questionnaire (SDQ, Goodman, 2001). Dimensional measures of conduct problems, ADHD, emotional symptoms, and prosocial behavior were associated directly with several risk factors indices and with interaction of risk factors. Also, gender interacted with risk factors to predict health outcomes. Neither main effects nor interaction effects were predictive of peer problems. The risk factors associated with foster home adolescents' social and emotional health are broadly in line with previous published findings. Indicated prevention public health programs should target this high-risk population and seek to reduce risk factors while simultaneously strengthening protective factors to enhance adolescents' mental health. In addition, these programs need to address multiple targets, which will benefit a wide range of individuals in this population.

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The necessity to study about children living in foster care homes and adopted children has become nowadays a clear priority. The number of orphans in different world countries is increasing at tremendously rapid rates. The reasons for this phenomenon can be attributed to many factors, among them, war, global diffusion of lethal diseases like HIV, and poverty. For instance, due to American invasion and prevailing terrorism, more than 5 million Iraqi children have become orphans, and are being taking care in traditional foster care homes and orphanages in Iraqi cities (Abdullbaghi, Qahar, Majeed, Rasheed, von Knorring, 2005). In addition, Birdwhistle, Floyd, Machingura, Mudziwapasi, Gregson & Glynn (2008) report that AIDS has orphaned 15 million children in Zimbabwe. Likewise, de Witt (2007) refers to Africa's orphan crises and reports that almost 15% of children in 11 of the 43 countries in sub-Saharan Africa are orphans. And Juffer and IJzendoorN (2005) indicate that international adoption is an increasing phenomenon involving more than 40000 children a year moving between more than 100 countries.

Why should this population be a priority for receiving mental health services? In adolescent health, where more than 75 percent of all mortality is related predominantly to social and behavioral factors, there has been extensive research over the past generation that has strived to identity the behaviors that predispose to negative health status both in the short term (during the teenage years) and long term (in adulthood). This stream of research, as Jessor (1991) notes, integrates behavioral epidemiology and social psychology. Over the past 25 years, it first proposed various theoretical frameworks. More recently, it has marshaled the empirical data that support our understanding of how behaviors are interrelated, the factors that influence health-risk behavior participation, and the factors associated with avoiding the same behaviors (Blum, McNeely & Nonnemaker, 2001).

One problem that has complicated the research is the lack of a commonly agreed-on language. Specifically, we use the concept of "risk" in two distinctly different ways. One refers to risk-taking behaviors (e.g., smoking, drinking and driving, and unprotected sexual intercourse), which in themselves predispose to negative health outcomes (though in themselves they are not synonymous with the negative health outcomes such as emphysema, vehicular injury, and sexually transmitted diseases). Concurrently, we refer to the "at-risk" adolescent, which in our society too often is code for demographic "disadvantage" (e.g., orphanhood, minority status, poverty, and single-parent families). "At risk" may also refer to other disadvantages. As Rutter (2006), Garmezy (1987), Werner and Smith (1982), and others have shown, disadvantage may be biologic (e.g., diabetes), genetic (e.g., Trisomy 21), familial (e.g., mental illness), social (e.g., violent neighborhoods), or peer related (e.g., antisocial behaviors). For the present paper, following Blum et al (2001) suggestions, we refer to "vulnerability" as an interactive process between the social contexts in which a young person lives and a set of underlying factors that, when present, place the young person "at risk" for negative outcomes (e.g., school failure, unanticipated pregnancy, injury). Factors predisposing to vulnerability may be biologic (e.g., chronic illness), cognitive (e.g., how risk is assessed) or social (opportunity for performing a behavior for example in terms of the availability of drugs). Vulnerabilities may result from being reared in disadvantaged environments such as in substance-abusing families, abusive/violent environments, families with mental illness, or mothers/fathers involved with the criminal system and it can result as well from individual characteristics such as aggressive temperament.

Orphanhood is considered an ‘at-risk’ condition for human infants, children, adolescents and adults because the risk prevails throughout the entire lifespan. Notwithstanding, the type (i.e., maternal only-, paternal only-, or double orphanhood) and the timing of orphanhood (i.e., before or later than age 12), the younger the child enters into residential care and the

longer the individual spends in institutional care, the more severe the outcomes will be, in terms of dysfunction of cognitive abilities (Beckett, Maughan, Rutter, Castle & Colvet 2006), emotional adjustment (Colvert, Rutter, Beckett & Castle, in press), mental health (Rutter, Colvert, Kreppner, Beckett, Castle, Groothues, Hawkins, O'Connor, Stevens & Sonuga-Barke, 2007) and vulnerability to stress and disease (Maunder & Hunter, 2001).

Our review of the literature indicates that orphan children and other vulnerable children (i.e., children living in high poverty conditions) significantly differ from other children in several important indices of mental health and wellbeing (e.g., Giese, Meintjes, Croke & Chamberlain, 2003; Monk, 2000; Snider & Dawes, 2006). For instance, greater incidence of internalizing problems has been found with orphan children (Atwine, Cantor-Graaea & Bajunirweb, 2005; Cluver & Gardner, 2007; Gilborne, Apicella, Brakarsh, Dube, Jemison, Kluckow, Smith, Smith & Snider, 2006; Makaye , Mboussou, Bansimba, Ndinga, Latifou & Ambendet, 2002; Manuel (2002); Makame, Ani, Grantham & McGregor, 2002; Wild, Flisher, Laas & Robertson, 2006). Although, results regarding psychosocial outcomes may be difficult to compare among studies, given the variety of instruments used in assessments, the following findings give evidence of increased incidence of internalizing problems (anxiety, depression, hostility, somatization, and worry/stress) among orphans compared with nonorphans, or children living with sick parents or sick adults. For instance, Atwine, et al (2005) demonstrated that orphanhood was the only significant predictor of outcomes of psychosocial disorder, and in Wild's et al (2006) study children orphaned by causes other than parental illness reported more depression and anxiety than non-orphans, and lower self-esteem than both non-orphans. Finally, Cluver and Gardner (2007) noted that both orphans and non-orphans scored highly for psychosocial distress and there were no statistically significant differences on total scale scores; however individual item analysis showed significantly more reports of somatic problems, difficulty concentrating, and displaying anger through loss of temper in orphans. It is possible that the relatively small sample size in this study (30 orphans compared with 30 controls) was insufficient to

detect a difference in total scores. However, Cluver & Gardner (2007) also specifically measured post-traumatic stress symptoms and found that 73% orphan children scored above the cut-off for posttraumatic stress disorder.

There is a weaker evidence for externalizing behavior among studies reviewed in the orphan literature. This finding could be attributed to the tendency of youth to under-report conduct problems on surveys and due to this fact it is recommended that in order to obtain a more accurate assessment of externalizing behavior, ratings on conduct problems and hyperactivity and inattention disorder be collected from caregivers (Barnett & Whiteside, 2002). Caregivers however have been found to under-report internalizing distress in children in this study.

In terms of risk behaviors, Nyacumta, Gresgson, Lopman, Saito, Watts, Monasch & Jukes (2006) reported several findings; first, onset of sexual activity among adolescent orphan girls and boys aged 12-17 was found to be earlier than non-orphans, and early onset of sexual activity was associated with being out of school, and increased psychosocial disorder. Birdthistle, Machingura, Mudziwapasi, Gregson & Glynn (2008) examined the relationship between orphanhood and HIV risk in Zimbabwe and found that the prevalence of HIV and /or HIV-2 was higher among orphans than non-orphans. Maternal orphans were less likely to use condom at first sex and to have a regular sexual partner; putting these adolescents at risk for HIV infection in this country (Birdthistle et al, 2008).

Gilborn (et al., 2006) assessing 1,258 orphan and vulnerable made children found that girls not only reported more psychosocial distress on specific items in the survey instrument, they also scored higher on composite indices for traumatic experiences and daily stress scores.

In sum, then it can be stated that, orphans' loss of parental attachment and repeated flashback of traumatic experience, impose a sense of overburden and responsibility in them, and due to cumulative exposure to trauma, worry and stress, these children adopt an external locus of control (or self-determination) (Chatterji, Dougherty, Ventimiglia, Mulenga, Jones, Mukaneza, Murray, Buek, Winfrey & Amon, 2005), which among other factors, not withstanding attachment disorders (Rutter et al, 2007; Zeanah, 1996), reduces their ability to cope with stress and disturb their normal

psychological development. Thus, preventing psychological distress among orphan adolescents should be a key public health priority.

Mrazek and Haggerty (1994) distinguish between *universal* prevention programs administered to the entire population, *selected* programs administered to individuals at high risk for future problems, and *indicated* programs administered to individuals who have symptoms of the disorder but are below diagnostic threshold. Selective risk-prevention studies have been targeted at youths at elevated risk because of orphanhood, poverty, bereavement, divorce, parental illness or substance dependence, whereas indicated risk-prevention programs have targeted adolescents with elevated psychopathological symptoms (Horowitz & Garber, 2006).

Selective and indicated prevention programs are considered targeted prevention approaches.

Improving our understanding of how best to identify high-risk groups for targeted prevention programs would allow interventionists to focus on those at greater risk. Furthermore, Munoz, Le, Clarke, and Jaycox (2002) argued that it is imperative to identify groups at sufficiently high risk to provide adequate statistical power to test whether interventions prevent psychopathological symptoms onset. An improved ability to identify those at greatest risk may increase the effects of psychological distress-prevention programs.

Elucidating risk factors that identify youths at elevated risk for psychopathological symptoms—including conduct problems, Attention Deficit Hyperactivity Disorder (ADHD); emotional problems, and peer problems-- should also advance knowledge regarding etiologic processes for these pernicious disorders.

Comprehensive theories of adolescent problem behavior propose risk factors at multiple levels of the social environment, including the family, peer, school, and neighborhood contexts (Cataldo & Hawkins, 1996; Jessor, 1998; Lerner, Fisher, & Weinberg, 2000). The social development model (Cataldo, Kosterman, Hawkins, & Newcomb, 1996) postulates that affective and behavioral problems or risk behaviors have common roots, and that not all risk factors are equal in terms of outcomes. Furthermore, this model, like other prominent developmental models of conduct

disorders, such as the dynamic systems approach (e.g., Granic & Patterson (2006); the stage ('gateway' theory) theories of alcohol and drug use (e.g., Kandel & Faust, 1975); co-morbidity epidemiological theory (e.g., van Kammen & Loeber, 1994), and maladaptive coping theory (e.g., Spear, 2000), suggests a chain-like association among risk factors throughout the adolescent's developmental trajectory and postulate that the accumulation of risk is an important factor in itself. Jessor's (1992; 1998) Problem Behavior Theory is concerned with the relationships among five domains or categories of variables: (1) biology/genetics (that genes for the neurobiology of substance abuse may be "turned on" based on environmental or social events); (2) the social environment system (which includes factors such as poverty and family structure); (3) the perceived environment (like perceptions of friends' and parents' attitudes toward behaviors); (4); the personality system (values, expectations, beliefs, attitudes, and orientations toward self and society); and (5) the behavioral system (behaviors such as poor school performance). Each psychosocial system contains variables that act as instigators or controls on problem behavior. The strength of these variables results in proneness: the likelihood that problem behavior will occur (Jessor, Donovan, and Costa, 1993). Weakening instigators or strengthening controls, helps decrease a child's "overall proneness for problem behaviors" (that is, the likelihood that the child will engage in risky or unhealthy behaviors). As conceptualized by Jessor (1992), *risk behavior* (also known by the term *problem behavior)* constitutes a wide variety of behaviors that jeopardize one or more elements of health or development. Whether the behavior is drinking, early sexual intercourse, or drug use, Jessor argues that these are not random but rather "functional, purposive, instrumental, and goal-directed." Whether or not young people accurately assess the risk inherent in any given behavior, problem behavior theory holds that the actual (or perceived) risk pales next to the developmental goals they advance (e.g., presenting oneself as more mature).

A third theoretical approach derives from combinations of diverse theories. For instance, the Social Systems Framework (Lerner et al., 2000)

is an adaptation of the Bronfenbrenner's (1989) model of human development, Jessor, and Jessor (1977) problem behavior theory. An underlying premise of this model is that the impact of more distal, contextual factors (e.g., exo-system) on problem behaviors (i.e., behavior system) is mediated by more proximal, interpersonal factors (i.e., micro/meso-systems) and personal factors (i.e., infrasystem).

Empirical research generally substantiates these concepts. For instance, Jessor and colleagues (e.g., 1993; 1998, 2003; 2006) have successfully demonstrated the predictive validity of tripartite theory-derived model constructs of risk in relation to risk behavior involvement. Also, Hawkins, Catalano, & Miller, 1992) have found support for the following risk factors predictors of adolescent and adult substance abuse: (a) children's lack of social competence and inability to get along with other children; (b) poor self-regulation, self-control, and impulse control; (c) weak social bond with the school, and resulting academic failure; and (d) poor parental investment in the child (involving a lack of a warm and protective environment and consistent discipline) and in parenting interventions. Other research within the Social Systems framework (Marte, 2006) has found that proximal factors like family conflict and parental monitoring partially mediated the influence of more distal risk factors of neighborhood risk on problem behaviors. Marte (2006) found that anger control mediated the relationship between family conflict and problem behaviors among female and rural adolescents. Moreover, research has shown that distal risk factors like community risk factors may provide the inappropriate models and opportunities for youth to engage in problem behaviors and thus would facilitate the incidence of risk behaviors and presence of externalizing and internalizing symptoms (e.g., Dekovic, 1999).

Together, this work provides evidence that factors at multiple ecological levels are important for promoting negative behavior and thus impair normal healthy development. However, two main concerns remain for research in the Iranian context. First, much of the previous research focuses on single contexts, rather than understanding how factors in multiple contexts coexist to promote and detract from ideal outcomes. Second, much of this work has considered problem behaviors like drinking alcohol,

smoking cigarettes, and becoming involved in antisocial behaviors; however, much lesser number of studies have tested major theoretical models focusing on risk- or problem behaviors.

Although, numerous risk factors have been suggested in the literature, we focus on those risk factors developed within the framework of Problem-Based theory and which have had the strongest empirical support (e.g., models risk, opportunity risk, and vulnerability to risk). Given the specific vulnerability of orphan children in term of attachment, we included a measure of alienation from main caregivers and peers.

Risk factors

Research on risk highlights the need to consider multiple risk factors at the individual, family, peer group; school and neighborhood, in evaluating adolescents' outcomes (e.g., Dekovic, 1999; Costa, Jessor, Donovan, & Fortenberry, 1995). Orphan youth living in foster care homes, in particular, are exposed to considerable levels of chronic hassles/stress and deprivation, violence, poverty and abuse (Castle, Groothues, Bredenkamp, Beckett, O'Connor,Rutter (1999) that have deleterious effects on adjustment and cognitive functioning (e.g., Fisher, Ames, Chisholm, & Savoie, 1997). Problem based theory (Jessor, 1992; 1998) postulates that negative economic conditions and poverty have an adverse effect on the family environment creating conditions of stress that impact parent-child relations and subsequent child adjustment (Jessor, 1998). The present study, based on Jessor's (1998) theory, focuses on risk models (caregiver, peer, school and community models for deviant behavior); presence of two kinds of opportunity for engaging in risk behavior (one, in terms of availability of drugs or adults selling drugs and presence of gangs at the foster home and in the neighborhood; and second, neighborhood poverty); and vulnerability risk of two kinds (one, feeling depressed and perceived stress, at the foster home, school and the community; and a second vulnerability risk, a combination of low self esteem together with low expectations for success in life).

Tinsley li, Nussbaum, and Richards (2007) report that hassles and interpersonal stress have been found to inversely relate to adjustment and

to predict outcomes in ways distinct from measures of global negative life events (Compas, Howell, Phares, Williams, & Giunta, 1989). Furthermore, the experience of high levels of stress, hassles and deprivation is a well-known predictor of poor youth adjustment (e.g. Deardorff, Gonzales, & Sandler, 2003; Pungello, Kupersmidt, Burchinal, & Patterson, 1996). Exposure to violence, particularly victimization, has been identified as a significant problem affecting urban youth with clearly established deleterious consequences (Fitzpatrick & Boldizar, 1993; Margolin & Gordis, 2000). Tinsley Li's et al (2007) review of the literature on the potential impact of exposure to violence, and indicate that youth who are exposed to violence are at risk for internalizing and externalizing symptoms and future problems in life-course development (Weist and Cooley-Quille, 2001). Thus, study after study identifies exposure to violence and victimization as significant risks that contribute to adverse outcomes (e.g., Attar, Guerra, & Tolan, 1994; Bell & Jenkins, 1993).

Tinsley Li's et al (2007) clearly state that poverty, both in terms of family level indices and neighborhood level indices, has been established as a risk factor for poor youth adjustment (Bradley & Corwyn, 2002; Evans, 2004; Luthar, 1999). Living in low income families has been associated with a variety of negative outcomes for children, including behavioral difficulties, emotional distress, and academic failure (Conger, Ge, Elder, Lorenz, & Simons, 1994; Duncan & Brooks-Gunn, 1997; McLoyd, 1998). In addition, neighborhood poverty appears to have direct and moderating effects on parenting (Ceballo & McLoyd, 2002; Furstenberg, Cook, Eccles, Elder, Sameroff, 1999), life stress (Allison, Burton, Marshall, Perez-Febles, Yarrington, Kirsh & Merriwther-DeVries, 1999), as well as child outcomes (Dubois, Felner, Meares, & Krier, 1994; Leventhal & Brooks-Gunn, 2000).

The primary aim of the present study is to investigate a broad array of putative risk factors at the individual, foster home, peer group; school and neighborhood, in evaluating orphan adolescents' outcomes in terms of presence of internalizing and externalizing psychopathological symptoms and examine the differential associations of these risk factors with specific affective and behavioral difficulties, explicitly considering conduct

problems, AHDH, emotional symptoms and peer problems. The secondary aim is to identify risk interactions and gender interactions that would provide preliminary empirical support for potentially novel risk mechanisms in etiologic models of adolescents' mental health in Iran.

Five key hypotheses are addressed in this study.

1. Theoretically derived risks composite measures account for variation in internalizing and externalizing problem behavior, as measured by the SDQ total difficulties scale and SDQ subscales.
2. Considering females and males separately, theoretically derived risks composite measures account for variation in internalizing and externalizing problem behavior, as measured by the SDQ total difficulties scale.
3. Risk factors interact with other risk factors in the prediction of total difficulties and independently measure internalizing and externalizing problems, including conduct problems, ADHD, emotional problems and peer problems.
4. Gender is a moderator of some associations between risk factors and internalizing and externalizing problem behavior, either assessed by total behavior difficulties scores or by independent subscale scores, denoting conduct problems, ADHD, emotional problems and peer problems.
5. Risk factor subscales composing theoretically derived composite indices account for variation in internalizing and externalizing problem behavior, as measured by the SDQ total difficulties scale and SDQ subscales.

Method

Participants

Participants in the final sample were 140 orphan adolescent girls (n = 69) and boys (n= 71) (*M* age = 15.4 years, *SD* = 1.54, range 11–18) from governmental foster home centers in a large city, mainly representing eastern and southern city district areas. Foster home centers in Iran house adolescents of only one gender. Three groups were represented: early

adolescence (between 11 and 13 years old; 21 females and 17 males), middle adolescence (between 14 and 15 years old; 32 females and 33 males) and late adolescence (between 16 and 18 years old; 16 females and 21 males). The sample included adolescents from diverse regions of the country, conforming to an ethnically varied sample. All adolescents in the sample were actively involved in school. Reasons for the child becoming placed in the foster home were diverse, mainly due to death of mother and/or father or both; presence of a serious problem with the father or/and mother of the child, due to imprisonment, addiction, deviant behavior of one or both of the parents, absence of grandparents or other first degree relatives that could assume responsibility for the caring of the child and other conditions that incapacitated the family to provide the necessary care to the child and thus to keep the child with them in one household.

Procedures

The study was described as an investigation of adolescent mental health. Foster home consent was obtained, wherein an informed consent letter was sent to each foster home center after obtaining permission from the Ministry of Health. Participants completed a risk factor survey in their own classrooms and foster-care caregivers filled out questionnaires for each adolescent regarding their mental health. Here the term caregiver refers to the person who attends the adolescent at the foster home, and the term teacher is reserved for adults at school settings. Given the fact that no previous research testing Jessor's model has been carried out in Iran, in particular with populations of orphan adolescents, first of all, we explore the multivariate account of risk factors in the whole sample considering composite scores of five risk measures. Next, we assess whether risk-risk interaction effects denoting moderation of some risk factors on other risk factors in relations to SDQ total difficulties and subscales of problem behavior were evident in the data. Third, we examine the generality of the explanatory model across genders in the sample. Finally, we explore whether the component subscales of the composite risk factor measures have differential importance in the sample considering SDQ total difficulties and SDQ-subscales as the criterion measures.

Measures

Risk Factors

Scales utilized in the present study come from composite measures of the three types of risk (models, opportunity, and vulnerability) of Jessor's (1998) theoretical framework. Four multiple item subscales from the *models risk* composite assessed social models for a variety of risk and deviant behaviors (e.g., cigarette smoking, alcohol use, poor dietary habits) across the four social contexts of family, peers, school, and neighborhood (e.g., ''Does anyone in your close family smoke cigarettes?'' ''How many of your friends use marijuana?'' ''How many of the students at your school get into fights?''''How much drinking is there among adults in your neighborhood, as far as you know?'').

Ten multiple-item subscales from the *opportunity risk* composite assessed availability of cigarettes, alcohol, and drugs in the home, perceived availability of cigarettes, alcohol and drugs in the neighborhood (e.g., ''If you wanted to get some alcohol to drink, would you be able to get some at home?''), perceived gang activity in the neighborhood and neighborhood youths' involvement in gangs (e.g., ''Do any of the kids in your neighborhood belong to gangs?''), and presence of signs of poverty and neglect in the neighborhood.

The *vulnerability risk* scales assessed two distinct constructs based on the confirmatory factor analysis. One construct included the items to measure personal vulnerability to risk, including felt stress and hassles with teacher, peers and other adults, and conflict with teacher (e.g., ''In the past six months, how much stress or pressure have you felt at school?''), and depression (e.g., ''In the past six months, have you just felt really down about things?''). Two subscales, one, limited perceived chances for success in life (e.g., ''what are the chances that you will have a happy family life?''), and the second, low self-esteem (e.g., ''On the whole, how satisfied are you with yourself?'') were included to asses the second vulnerability construct.

Composite models risk, opportunity risk and vulnerability risk measures were also utilized. Each composite measure is the average of all the items

in its component subscales, and represents a dimensional measure with higher scores indicating higher risk. Following the suggested procedure by Jessor (2003). The internal coherence of the composite risk measures was established by a confirmatory factor analysis, for each measure, that showed all of its component subscales loading on a single factor. The proportion of variance accounted for by the various single factors ranged between .23 and .44. In addition, the coefficients of internal consistency were generally satisfactory, as can be seen in Table 1.

Table 1
Risk Factor Composite Measures, Component Subscales, and Alpha Reliabilities.

Abbreviations	Measure (number of items)	α
	Risk factors	
1. MR-C	*Models Risk Composite Index* (13)	.790
2. MR-H	Foster home models for risk behavior (1)	-
3. MR-P	Peer models for risk behavior (3)	.760
4. MR-A	Adult models for risk behavior at foster home (2)	.844
5. MR-S	School models for risk behavior (6)	.720
6. MR-C	Neighborhood models for risk behavior (3)	.815
7. OR-C1	*Opportunity Risk–availability & gangs- Composite Index 1* (11)	.840
8.OR-DH	Availability of drugs & alcohol at foster home (2)	.869
9. OR-DC	Availability of drugs & alcohol neighborhood (2)	.766
10. OR-GH	Presence of gangs at foster home (2)	.787
11. OR-GC	Presence of gangs in the neighborhood (2)	.736
12. OR-C2	*Opportunity Risk–poverty- Composite Index 2* (3)	.710
13. VR-C1	*Vulnerability Risk-stress and depression- Composite Index 1* (9)	.811
14. VR-S	Vulnerability risk-Perceived stress (5)	.791
15. VR-TS	Vulnerability risk-Teacher Stress (1)	-
16. VR-TC	Vulnerability risk-Teacher Conflict (1)	-
17. VR-D	Vulnerability risk-Depression (4)	.723
18. VR-C2	*Vulnerability Risk-Low self-esteem and Low life expectations- Composite Index 2* (16)	.775
19. VR-L	Low expectations for success in life (8)	.783
20. VR-SE	Low self-esteem (8)	.650

Note. Example items of each subscale are presented in the text.

The alpha reliability of only one subscale (Low self-esteem) was relatively low: .650; however, alpha reliabilities of the other subscales as well as the five composite risk measures are all satisfactory, as can be seen in Table 1. This measure was nevertheless, retained to maintain the

theoretical comprehensiveness of risk assessment across the multiple contexts. Correlations among risk factor subscales range from -.178 to .640, and between the five risk factor composites range from -.161 to .57. Positive correlations are ideally expected however, the pattern of associations obtained indicated that individual level vulnerability risk factors (like depression, self-esteem, life expectations, and perceived stress) tended to be uncorrelated with contextual risk factors subscales (such as most subscales from the model risk or opportunity risk categories).

Alienation from Caregiver and Peers

The explicit inclusion of attachment risk factors is highly desirable with samples of orphan children and adolescents (Rutter, Kreppner, Murin, Colvert, Beckett, & Snouga-Barke, 2007; Zeanah, 1996). This construct was measured with a subscale of an adapted version of the Inventory of Parent and Peer Attachment (lPPA) (Armsden and Greenberg, 1987) replacing the word mother/father for 'main caregiver' and following item selection based on Nada Raja, McGee & Stanton's (1992) factor solution. The scale consisted of 8 items conforming communication and trust with main caregivers and 8 items for communication and trust with peers at the foster home centers, tapping the quality of communication, the degree of trust, and the alienation in caregiver-adolescent and adolescent-adolescent relationships (e.g., "I tell my caregivers about my problems and troubles" and (e.g., "My friends listen to what I have to say", respectively). Alienation from caregivers was measured with a 4-item scale (alpha = 58) tapping lack of attention from main caregivers, adolescents' irritability and lack of communication with main caregivers (e.g., I feel ashamed to speak about my problems with my main caregivers), and alienation from peers with a 4-item scale assessing adolescents' feelings of loneliness, hiding feelings from friends, insecurity in friendship and lack of communication with peers (e.g., "I tell my friends about my problems and troubles"). A 4-point Likert scale was used with categories of 1= almost never, 2= sometimes, 3= often, and 4= almost always.

An exploratory factor analysis was carried out with these 24 IPPA items (based on the factor solution reported by Nada Raja, McGee & Stanton,

1992) items 7 and 19 were reversed before the analysis), and a 3-factor solution was obtained. The first factor (α = .703) included six out of eight items (1, 2, 3, 5, 6, 11[reversed] & 19) from the caregiver attachment and communication subscale, plus 1 parent alienation item (item 11 [reversed] and one peer alienation item (19). Item 4 was lost due to loadings in more than one factor; Factor 2 (α = .700) was composed of seven out of eight items from the Nada Raja et al (1992) peer attachment scale, item 19 loaded on Factor 1; and Factor 3 (α = .58) was composed of three out of four caregiver alienation items (Items 9, 10, & 12) and all four peer alienation items (Items 21, 22, 23, 24). Due to our focus on risk factors, for the present purposes, only the Alienation Factor is included in our analysis.

Strengths and Difficulties Questionnaire (SDQ)

The standard SDQ (Goodman, 2001) proposes a five-factor structure for the assessment of adolescents' behavioral and emotional problems as well as prosocial behavior, such that it includes four problem subscales (emotional symptoms, conduct problems, hyperactivity / inattention, and peer problems) and one positive attribute prosocial scale. The total difficulties score is derived from the four problem sub-scales. In this measure, ten items are negatively worded, and 15 items refer to positive attributes, 5 of which are inverted before being summed up. Each item is rated on a 3-point Likert scale ranging from 0 (*not true*), 1 (*somewhat true),* or 2 (*certainly true*) and each of the SDQ subscales consists of five items, thus yielding scores between 0 and 10. The total difficulties score ranging from 0 to 40. Because the focus of this study is on problem behavior, the prosocial behavior sub-scale will not be analyzed. Alpha coefficients of internal consistency were computed for all standard problem behavior subscales (Conduct Problems, α = .60; Attention Deficient and Hyperactivity Disorder, α = .644; Emotional Symptoms, α = .612; and Peer Problems, α = .44. Inter-scale correlations ranged from +.172 – +.359 (all significant, $p < .05$), and as expected all positive correlations.

In order to see whether computed factors specifically for this sample would yield better coefficients of internal consistency, an exploratory

factor analysis was carried out with the 25 SDQ items, and a 4-factor solution was obtained. The first factor (α = .813) included 4 items (reversed) from the Prosocial Behavior subscale, plus 2 Conduct Problem items (item 5 & 7 [reversed]) and 1 Peer Problem item (item 14 [non-reversed]); Factor 2 (α = .743) was composed of four ADHD items (items 2, 10, 15 21[reversed]), two Emotional Symptoms (Items13 & 16), and one Peer Problems item (Item 19); Factor 3 (α = .612) was composed three Conduct Problem items (Items 12, 18, 12, & 22) and two Peer Problem items (Items 6 & 23); and Factor 4 (α= .493) clearly represented Emotional Symptoms as three of its four items were from this subscale (Items 3, 8, 24) and 1 item was from the Prosocial subscale (Item 4 [reversed]). Although the factorial structure of the SDQ in this population is a good topic for research in its own right; however, given the fact that in comparison to the standard subscales, higher alpha coefficients were obtained for only the ADHD subscale, and due to the exploratory nature of the present study, we decided to adhere to the standard scoring of procedures which would enable us to use normative data and available clinical cut-off points with Iranian children. Recently, the SDQ has been used as a measure of social-emotional health in cross-cultural research with normal youth (Cassels, Chan, Chung & Birch, 2010).

Statistical analysis

Data handling and all statistical analyses were carried out using SPSS software. The employed evaluation methods included principal component analysis, scale homogeneity analyses yielding measures of internal consistency (Cronbach's α). Tests of normality, linearity, homogeneity of variance were performed for all variables and non-parametric tests, Spearman's rank correlations.

Following Jessor's, (1998) analytic procedure, hierarchical multiple regressions are used to examine the applicability of the explanatory model to variation in adolescent problem behavior as denoted with SDQ total difficulties and SDQ subscales. Hierarchical regression lends itself to estimating interaction or moderator effects (Cohen & Cohen, 1983). Sociodemographic measures (gender, age, and foster care center of

residence) were entered at the first step of the regression. The theoretical predictors—the seventeen risk factor measures—were entered next in Step 2 to examine their association with problem behavior symptoms. At Step 3, cross-products of all risk factors were entered to examine whether risk factors interact and were, indeed, moderators of the effects of other risk factors and to determine whether those moderator effects provided a significant additional increment in variance accounted for. At Step 4, the model was tested for gender differences by entering all cross-products of gender with each of the risk factors and with their interactions.

Analyses with Composite measures of the theoretical predictors—the five composite risk factor measures—were also computed following a similar procedure.

Results

Correlations, means, and standard deviations for measured variables at the composite, theoretically derived indices, and subscale levels are presented in Table 2.

Patterns of most salient correlations were as follows: First, even though most models risk variables were meaningfully intercorrelated and correlated significantly with most opportunity risk scales, and to a lesser extent with vulnerability risk variables, only two correlations were significant with respect to the criterion variable, home risk models and community risk models correlated with conduct problems. Second, of all five opportunity risk scales, only opportunity risk-poverty was related to SDQ scores, and this association was quite systematic and in the expected direction, with total difficulties and all other SDQ subscales, with exception of peer problems. It is important to note that the majority of the intercorrelations among opportunity risk subscales were theoretically meaningful and significant. Third, vulnerability risk variables had only two significant correlations in the expected direction with SDQ total difficulties and SDQ conduct problems subscale. A negative correlation of low magnitude though significant was also obtained between the composite stress and depression index and peer problems. In this cluster of variables, even

though the subscale denoting ‘Low expectations for life success’ was meaningfully associated with perceived stress and with low self-esteem, it was not related to any other variable in the correlation matrix, and a similar situation applies for low self-esteem.

There were significant associations with age such that being older was associated with reports of higher presence of risk models at the foster home and higher scores in the composite risk models index, while being a female was positively correlated with low life expectancies for success, low self-esteem and composite vulnerability risk-low self-esteem and perceived low life success.

In regard to problem behavior—as indicated by their scores on the SDQ and on each of its components—adolescents, especially boys, obtained higher ADHD scores and reported higher levels of presence of risk peer models. With respect to risk factors, girls on the other hand reported greater vulnerability, reflecting lower expectations for success and lower self-esteem and vulnerability due to the sum of these two subscales—a vulnerability risk composite. Next, presentation of the results is organized in the order of the research questions posed in the introduction.

Testing Jessor’s Explanatory Model of Adolescent Problem Behavior

To examine whether the theoretical model of problem behavior based on composite factors predict behavioral difficulties, we regressed the SDQ Total Difficulties score on the theoretical measures of risk—five risk composite scores—in a hierarchical multiple regression analysis.

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Table 2

Means, standard deviations and correlations between covariates, risk factors and outcomes

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. MR-C	-																									
2. MR-H	.559**	-																								
3. MR-P	.521**	.602**	-																							
4. MR-A	.540**	.367**	.386**	-																						
5. MR-S	.811**	.302	.253**	.236**	-																					
6. MR-C	.565**	.161	.183*	.223**	.119	-																				
7. OR-C1	.565**	.262**	.446**	.414**	.292**	.512**	-																			
8.OR-DH	.473**	.305**	.488**	.483**	.305**	.197*	.724**	-																		
9. OR-DC	.392**	.119	.289**	.224**	.172*	.467**	.858**	.462**	-																	
10. OR-GH	.386**	.240**	.452**	.492**	.200*	.178*	.763**	.627**	.531**	-																
11. OR-GC	.461**	.159	.179*	.132	.212*	.637**	.694*	.168*	.549**	.311**	-															
12. OR-C2	.199*	-.023	-.031	.095	.177*	.282**	-.105	-.105	.272**	.045	.272**	-														
13. VR-C1	.354**	.296**	.306**	.158	.384**	.033	.069	.167*	.033	-.007	.001	.015	-													
14. VR-S	.256**	.243**	.253**	.038	.282**	.001	.121	.121	.077	.037	.037	.068	.802**	-												
15. VR-TS	.328**	.359**	.250**	.214**	.216**	.154	.187*	.187*	.112	.100	.219**	.107	.673**	.546**	-											
16. VR-TC	.247**	.106	.063	..093	.293**	.043	.073	.073	.020	-.001	.0526	.022	.549**	.377**	.463**	-										
17. VR-D	.275**	.212*	.270**	.162	.334**	-.065	.132	.132	.037	-.071	-.106	-.083	.844**	.365**	.365**	.281**	-									
18. VR-C2	-.004	-.072	-.041	-.010	-.074	.132	.075	.098	.031	.019	.073	-.145	-.142	-.124	-.041	.099	-.125	-								
19. VR-L	.027	-.012	.036	.019	.061	.118	.108	.121	.055	.035	.128	-.117	.437**	.001	-.038	-.069	-.131	.868**	-							
20. VR-SE	-.037	-.112	-.015	-.067	-.074	.108	.039	.039	-.020	.009	-.023	-.088	-.036	-.038	-.032	-.111	-.167*	.824**	.452**	-						
21. A	.195**	.112	.140	.112	.222**	-.008	.260**	.26**	.125	.086	-.038	-.030	.360**	.282**	.243**	.091	.338**	-.136	-.113	-.118	-					
22. SDQ-TD	-.022	-.094	.023	.011	-.048	.048	-.140	-.060	-.024	-.036	.015	.293**	.282**	.057	.057	.114	.081	.102	.027	.114	-.025	-				
23. SDQ-CP	.234**	.110	.095	.149	.129	.234**	-.018	.060	.041	.048	.110	.210**	-.126	.209*	.209*	.107	.111	.117	.039	.130	.052	.603**	-			
24. SDQ-ADHD	-.087	-.066	-.021	.023	-.103	-.009	-.198*	-.147	-.100	-.149	-.018	.212*	-.026	.031	.031	.133	.046	.057	.033	.048	-.120	.727**	.208*	-		
25. SDQ-EP	-.082	-.156	.050	.-.117	-.048	-.021	-.143	-.035	-.012	-.012	.059	.289**	-.065	-.112	-.112	.001	-.043	-.027	-.075	.014	-.127	.685**	.214*	.335**	-	
2 26. SDQ-PP	-.135	-.150	-.070	.018	-.113	-.087	-.002	-.032	.015	.029	-.123	.006	-.208*	.019	.019	.057	.104	.128	.077	.117	.146	.660**	.172*	.359**	.293**	-
Mean	22.42	1.57	1.32	2.51	11.55	5.51	12.26	2.85	3.56	2.51	3.34	6.54	21.87	7.76	2.44	2.35	9.32	33.46	16.02	17.44	13.42	2.96	4.20	3.20	3.06	16.30
SD	5.44	.87	.61	1.01	3.48	2.16	4.22	1.43	1.61	1.01	1.50	2.28	6.17	2.48	1.08	.981	3.45	7.94	5.00	4.37	5.68	2.17	2.28	2.10	1.95	4.00

Note. N = 140. MR-C = Models Risk- Composite index. MR-H = Foster home models for risk behavior. MR-P = Peer models for risk behavior. MR-A = Adult models for risk behavior at foster home. MR-S = School models for risk behavior. MR-C = Neighborhood risk models. OR-C1 = Opportunity risk–availability & gangs- Composite Index 1. OR-DH = Availability of

drugs & alcohol at home. OR-DC = Availability of drugs & alcohol neighborhood. OR-GH = Presence of gangs at foster home. OR-GC = Presence of gangs in the neighborhood. OR-C2 = Opportunity risk–poverty- Composite Index 2. VR-C1 = Vulnerability risk-stress and depression- Composite Index 1. VR-S = Vulnerability risk-Perceived stress. VR-TS = Vulnerability risk-Teacher Stress. VR-TC = Vulnerability risk-Teacher Conflict. VR-D = Vulnerability risk-Depression. VR-C2 = Vulnerability risk-Low self-esteem and Low life expectations- Composite Index 2. VR- L= Low expectations for success in life. VR-SE = Low self-esteem. A = Alienation. SDQ-TD = Strengths and Difficulties Questionnaire-Total Difficulties. SDQ-CP = Strengths and Difficulties Questionnaire-Conduct Problems. SDQ-ADHD = Strengths and Difficulties Questionnaire-Attention Deficit and Hyperactivity Disorder. SDQ-ES = Strengths and Difficulties Questionnaire-Emotional Symptoms. SDQ-PP = Strengths and Difficulties Questionnaire-Peer Problems.

* $p < .05$

** $p < .01$

In Table 3, following Jessor et al (2003) procedure, we present both standardized regression coefficients (betas) and unstandardized regression coefficients (B-weights). This permits us to compare betas at Step 2 before the interaction terms are entered and to examine interactions, at Steps 3 and 4, that require use of unstandardized regression coefficients (Aiken & West, 1991, pp. 40–47). The final regression model, representing the influence of each variable with all other variables (including interaction terms) present in the equation, is shown in Table 3.

Table 3
Hierarchical regressions of SDQ Total Difficulties on Composite Risk Factors

		Total Sample (N = 140)				Females (n = 69)				Males (n = 71)			
Step		β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2
1	Demographic Variables			.017	.017			.067*	.067*			.010	.010
	Gender												
	Age					-.26**							
	Home												
2	Risk Factors			.139**	.156**			.247**	.314**			.127	.137
	OR-C2	.887**	4.91**			.417**	4.95**			.927**	6.14**		
	VR-C1					.245*	-.637						
	VR-C2	.144*	.152			.202**	.691**						
3	Risk Factors Interactions [c]			.063	.219			.187	.501			.214*	.352*
	OR-C2 X VR-C2										-.239**		
4	Gender Interactions [c]			.025	.244								

Note. N = 140. OR-C2 = Opportunity risk–poverty- Composite Index 2. VR-C1 = Vulnerability risk-stress and depression- Composite Index 1. VR-C2 = Vulnerability risk-Low self-esteem and Low life expectations- Composite Index 2.

[a]Standardized regression weights at Step 3, before interaction terms are entered.

[b]Unstandardized regression weights are displayed; standardized weights are deemed inappropriate with interaction terms (see Aiken &West, 1991, pp. 40–47).

[c]Only significant interactions are included.

[d] Approaches significance.

* $p \leq .05$;

**$p \leq .001$.

As depicted in Table 3, socio-demographic measures, entered at Step 1 of the regression analysis, accounted for less than 1% of the variance in total SDQ behavioral difficulties. The five composite measures of risk factors, entered at Step 2, accounted for an additional 14% of the variance. None of the risk factors interactions (5%) nor gender interactions were significant (2%). The two most important component risk factors for the whole sample in this analysis are opportunity risk-poverty and vulnerability risk denoting low self-esteem and perceived poor life possibilities of success. In the whole sample, then, the most important risk factors are context-level opportunity risk and individual-level vulnerability.

Testing the Generality of the Model across Males and Females

To examine whether the postulated risk factors predict behavioral difficulties considering girls and boys separately, we regressed the SDQ Total Difficulties score on the theoretical measures of risk—five risk composite scores—in a separate hierarchical multiple regression analysis for each gender. Results were significant for girls and boys. The final regression models are shown in Table 3. In the case of females, age is significant; the younger girls obtained higher scores. The total variance accounted for in SDQ Total Difficulties is 50% (in comparison to 24% in the whole sample or 32% in males). Increases of 25% (versus14% and 13%, in the whole sample and male sample, respectively) are due to the main effects of risk, and although 18% increases are accounted for Risk x Risk interactions, this increase is not significant. Among the most important component risk factors for females, two were the same as those with the whole sample, with addition of stress and depression (an individual vulnerability risk factor). The profile for males is different from that of females, in case of males (in contrast with females) only risk x risk interaction terms were significant, with one interaction term, the opportunity risk – availability and gangs component x low self-esteem and low expectations of success in life, reaching significance.

Testing the Model with Individual SDQ Scales of Internalizing and Externalizing Symptoms

Although it is useful to know that risk factors are associated with the higher order construct of psychopathological symptoms, due to the fact that in the past, researchers have argued that risk factors are mainly associated with internalizing behavioral problems (e.g., Dekovic, 1999), it is important to examine the applicability of the explanatory model to internalizing and externalizing symptoms, separately. The SDQ is a measure that offers this possibility, as its four subscales assess three kinds of externalizing problems, conduct disorder, ADHD, and interpersonal problems, and one internalizing problem category. As noted earlier, the interrelations among SDQ subscales is quite adequate with an average of .67. The regression analysis, described earlier, was repeated separately for each of the four subscales of the SDQ, conduct problems, ADHD, emotional symptoms, and peer problems. Results of these analyses are depicted in Table 4.

For conduct problems, socio-demographic measures, entered at Step 1 of the regression analysis, accounted for less than 1% of the variance in behavioral difficulties. Foster home center yielded significant results, with centers located in the eastern area being compared to those located in the southern area of the city (correspondingly coded +1 and -1). The five composite measures of risk factors, entered at Step 2, accounted for an additional 11% of the variance. The strongest risk predictor was models risk at the foster home, followed by opportunity risk and vulnerability risk. None of increments in variance due to risk factors interactions nor gender interactions are significant; however one gender interaction with vulnerability composite-low self-esteem and low perceived success in life, reached significance.

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Table 4
Hierarchical regressions of SDQ Scales on Composite Risk Factors (N = 140)

		Conduct Problems				ADHD				Emotional Problems				Peer Problems			
Step		β^a Step 2	B^b Final Step	ΔR^2	R^2	β^a Step 2	B^b Final Step	ΔR^2	R^2	β^a Step 2	B^b Final Step	ΔR^2	R^2	β^a Step 2	B^b Final Step	ΔR^2	R^2
1	Demographic Variables			.076**	.076**			.058*	.058*			.014	.014			.010	.010
	Gender					-.198**	1.09*										
	Age					-.131	-.246*										
	Home	.305***	.557**														
	Risk Factors			.114***	.190***			.087**	.145*			.112***	.126***			.072	.082
	MR-C	.218*	.638*														
	OR-C1	-.196*	-.005														
	OR-C2	.231*	.599			.263***	1.26**			.320***	1.88***						
	VR-C2	.16as	.004			.156[as]	.006										
	Risk Factors Interactions[c]			.047	.238			.201.	.056			.146*	.272*			.092	.174
	MR-C						.002*										
	OR-C1 x VR-C1										-.002*						
	OR-C2 x VR-C1										-.002*						
	OR-C2 x VR-C2										-.002*						
	Gender Interactions[c]			.060	.298			.078*	.279*			.030	.303			.042	.216
	G x VR-C2		.006**														

Note. N = 140. MR-C = Models Risk Composite Index. OR-C1 = Opportunity risk–availability & gangs- Composite Index 1. OR-C2 = Opportunity risk–poverty- Composite Index 2. VR-C2 = Vulnerability risk-Low self-esteem and Low life expectations- Composite Index 2.
[a]Standardized regression weights at Step 3, before interaction terms are entered.
[b]Unstandardized regression weights are displayed; standardized weights are deemed inappropriate with interaction terms (see Aiken &West, 1991, pp. 40–47). [c]Only significant interactions are included. [d] Approaches significance * $p \leq .05$; **$p \leq .001$.

In the analysis of ADHD, total variance accounted for: 28%, there is a significant increment of less than 1% of variance accounted for age and gender; a small but significant increment of less than 1% of risk—one opportunity risk-poverty composite main effect was significant; the increment due to risk interactions was 20%--models risk at home interacted with vulnerability stress and depression; and, gender interactions added an additional 8%, although none of the particular interactions were significant in Step 4.

In the analysis of emotional symptoms (Table 4), 30% of variance was the criterion accounted for. Of the total variance, socio-demographic measures, entered at Step 1 of the regression analysis, accounted for less than 1% of the variance in behavioral difficulties. The five composite measures of risk factors, entered at Step 2, accounted for an additional 11% of the variance. The only risk predictor was opportunity risk-poverty in the neighborhood. Increments in variance due to risk interactions accounted for an additional 15% of the variance, and the interaction between opportunity risk-availability and gangs and stress and depression reached significance, two other interactions only approached significance—poverty and stress/depression and poverty and low self-esteem and low perceived life opportunities for success. Increments in variance due to gender interactions accounted for less than 1% of the variance.

Analyzing Subscale Components from Risk Composite Indices

Given the exploratory nature of the present study, it is important to investigate possible differences in the relative importance of the risk factors studied. Therefore, in the present study utilizing a hierarchical regression analysis, we entered the 17 separate risk factor subscales. This approach permits each risk-factor subscale to be optimally weighted in the regression equation to maximize the criterion variance accounted for, in contrast to the equal weighting that each risk factor item has in its composite measure. Now the relationship between each specific risk factor subscale and the SDQ Total Difficulties criterion measure can be seen.

Table 5
Hierarchical regressions of SDQ Total Difficulties on Risk Factors Subscales

		Total Sample (N = 140)				Females (n = 69)				Males (n = 71)			
Step		β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2
1	Demographic Variables			.017	.017			.067*	.067*			.007	.007
	Gender												
	Age					-.228*	-.723[as]						
	Home	.220*	-.109[ns]										
2	Risk Factors			.281***	.298***			.536***	.603***			.317[as]	.324[as]
	MR-H	-.437**	-2.84**							.004[ns]	-3.17*		
	MR-P									-.238[ns]	-3.76***		
	OR-DC									.103[ns]	5.18**		
	OR-P	.414***	3.83**			.398***	4.88[as]			.452**	3.25[as]		
	VR-D	.228**	.663[ns]			.449***	.318[ns]						
	VR-L					.319*	.367[ns]						
	VR-S	-.337***	-.320[ns]							-.370**	-.117[ns]		
	VR-TC	.198*	1.63*										
3	Risk Factors Interactions			.054	.352			.075	.678			.216*	.540*
	MR x VR-C2		.005[as]								.116***		
	OR-C1 X VR-C1										-.009*		
	OR-C2 X VR-C2		.002*								-.184***		
4	Gender Interactions			.160*	.512*								
	G x MR-H		-.744*										
	G x VR-D		.415*										
	G x A		-.335***										

Note. N = 140. MR-H = Foster home models for risk behavior. MR-P = Peer models for risk behavior. OR-DC = Availability of drugs & alcohol neighborhood. OR-P = Opportunity risk–poverty VR-D = Vulnerability risk-Depression. VR- L= Low expectations for success in life. VR-TC = Vulnerability risk-Teacher Conflict.

[a]Standardized regression weights at Step 3, before interaction terms are entered.

[b]Unstandardized regression weights are displayed; standardized weights are deemed inappropriate with interaction terms (see Aiken &West, 1991, pp. 40–47).

[c]Only significant interactions are included. [d] Approaches significance * $p \leq .05$; **$p \leq .001$.

As depicted in Table 5, the total variance accounted for in SDQ Total Difficulties is 53% (a marked increase over 24% explained by composite scores) in the whole sample. Increases of 28% are due to the main effects of risk, and the remaining increases are accounted for by numerous risk interactions and gender interactions. (Because the ratio of sample size to number of predictor variables is small, about 3 to 1, some portion of that account is probably due to capitalization on random sampling error.). The most important risk factors for the whole sample in this analysis are models risk at home, neighborhood poverty and teacher conflict; depression and perceived stress are significant at step 2 but B coefficients are non-significant in step 4. In the whole sample, then, the most important risk factors are context-level opportunity for risk in impoverished environments and individual-level vulnerability. There were no significant risk interactions; however, there were three significant gender interactions, as follows: gender interacted with models risks at home, depression, and alienation from caregivers and peers; opportunity risk-poverty interacted with perceived stress and depression; and gender interacted with depression, risk models at home, and alienation from caregivers and peers, in three different interactions.

Separate analyses by gender; indicate similar results as obtained with composite scores. Age was important in case of female adolescents and risk factors accounted for a substantial 54% of the variance in comparison to 32% of the variance among males. There was little overlap among the predictive risk factors in females and males, only one risk factor, poverty in the neighborhood, was shared by the two samples. For females depression, self-esteem and life prospects were important; while, for males, models at home, peer models and drug availability in the community were important. Another important difference in the risk profile of females and males refers to the pervasive presence of risk interactions among males but not females. Specifically, models risk interacted with vulnerability risk—low self-esteem and life expectations, opportunity risk interacted with stress and depression vulnerability, and poverty interacted with low self-esteem and life expectations.

In terms of SDQ subscales (Table 6), the risk model accounts for 57%

(versus 31%) of the variance in conduct problems, and there are significant increments of 22% of variance accounted for by risk; non-significant increments of less than 1% of variance accounted for by risk interactions; and, significant increments of 19% of variance accounted for by gender interactions.

Center was significant, with a positive sign, indicating that location of the foster home center makes an important difference for conduct problems. In terms of risk factors, three risk factor main effects were significant: perceived stress, poverty in the neighborhood, and depression. Two other risk factors only approached significance, availability of drugs and alcohol at home, and teacher stress. Four gender interactions involved teacher conflict, low self-esteem and life expectations and risk models at home.

Analysis of ADHD (Table 6) yielded a marked different profile with none of the steps in the regression equation being significant, and lesser amount of variance explained (45%). Likewise, analysis of SDQ-peer problems subscale did not yield any significant results.

In summary, results from analyses of SDQ behavioral difficulties does yield significant risk contribution to psychopathological symptoms, although the prediction comes from one risk composite only. When risk composite indices were decomposed higher proportion of variance is accounted for in total behavioral difficulties, with many of the same risk factors being significant. When both the criterion variable and the predictors are decomposed, very different profiles are obtained; for instance, risk factors exert more influence on conduct problems and emotional symptoms than ADHD or peer problems, and the predictors vary from one kind of behavioral problem to another. In addition, separate analysis with each females and males yields a different risk profile, such that risk has a greater impact on females and risk interactions are more important for males.

Table 6

Hierarchical regressions of SDQ Scales on Risk Factors Subscales (N = 140)

		Conduct Problems				ADHD				Emotional Problems				Peer Problems			
Step		β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2	β[a] Step 2	B[b] Final Step	ΔR^2	R^2
1	Demographic Variables			.076**	.076**			.058*	.058*			.014	.014			.010	.010
	Gender					-.126[as]	1.03[as]										
	Age																
	Home	.377***	.332***														
2	Risk Factors			.220***	.297***			.168[as]	.227[as]			.252***	.265***			.176	.186
	MR-H									-.234*	-.806[as]						
	MR-P									.348***	-.231[ns]						
	OR-DH	-.230[as]	-.305[ns]														
	OR-P	.241***	.281[ns]			.306***	.818[ns]			.352****	1.99****						
	VR-S	-.300***	-.195[ns]														
	VR-D	.196*	.188[ns]														
	…..VR-TS	.196[as]	.713**			.206*	.326[ns]			-.322***	.445[ns]						
	Risk Factors Interactions			.079	.376			.047.	.274			.144**	.409**			.070	.255
	MR-VR-D						.002*										
	OR-C1 x VR-C1										-.002**						
	OR-C2 x VR-C1										-.004**						
	OR-C2 x VR-C2										-.004**						
	Gender Interactions			.192***	.568***			.171[as]	.445[as]			.137[as]	.546[as]			.153	.408
	G x OR-DH						-.423***										
	G x VR-C2		.120*														
	G x VR-TC		.736***														
	G x MR-H		-.687*														
	G X VR-S										.283***						
	G x A										-.123***						

Note. N = 140. MR-H = Foster home models for risk behavior. MR-P = Peer models for risk behavior. OR-DH = Availability of drugs & alcohol at home. OR-P = Opportunity risk–poverty. VR-S = Vulnerability risk-Perceived stress. VR-TS = Vulnerability risk-Teacher Stress. VR-TC = Vulnerability risk-Teacher Conflict. VR-D = Vulnerability risk-Depression. VR-C2 = Vulnerability risk-Low self-esteem and Low life expectations-Composite Index 2. VR- L= Low expectations for success in life. VR-SE = Low self-esteem. OR-C1 = Opportunity risk–availability & gangs- Composite Index 1. OR-C2 = Opportunity risk–poverty- Composite Index 2. VR-C2 = Vulnerability risk-Low self-esteem and Low life expectations- Composite Index 2.A = Alienation.

[a]Standardized regression weights at Step 3, before interaction terms are entered.

[b]Unstandardized regression weights are displayed; standardized weights are deemed inappropriate with interaction terms (see Aiken &West, 1991, pp. 40–47).

[c]Only significant interactions are included.

[d] Approaches significance

* $p \leq .05$;

**$p \leq .001$

Analysis of ADHD (Table 6) yielded a marked different profile with none of the steps in the regression equation being significant, and lesser amount of variance explained (45%). Likewise, analysis of SDQ-peer problems subscale did not yield any significant results.

In summary, results from analyses of SDQ behavioral difficulties does yield significant risk contribution to psychopathological symptoms, although the prediction comes from one risk composite only. When risk composite indices were decomposed higher proportion of variance is accounted for in total behavioral difficulties, with many of the same risk factors being significant. When both the criterion variable and the predictors are decomposed, very different profiles are obtained; for instance, risk factors exert more influence on conduct problems and emotional symptoms than ADHD or peer problems, and the predictors vary from one kind of behavioral problem to another. In addition, separate analysis with each females and males yields a different risk profile, such that risk has a greater impact on females and risk interactions are more important for males.

Discussion

In this study, we examined a theory-derived explanatory model of psychosocial risk generalizability to female and male Iranian adolescents, and the relative importance of several possible risk factors for adolescent

internalizing and externalizing problem behavior. These factors cover three conceptual domains: models risk, opportunity risk, and vulnerability risk, involving individual attributes and four key contexts: caregivers/teachers (foster home) factors, peer factors, school factors and community factors. As stated before, Problem Based Theory (PBT-Jessor, 1992; 1998) is one of the most influential theories regarding the prediction of a wide variety of risk-behavior among adolescents. As an instance of its importance, PBT has served as a prominent theoretical base for the development of Life Skills Programs throughout the world, a well-known youth prevention program. Perhaps one feature of this theory that is most relevant for the purposes of identifying risk factors among adolescent populations is that it is an integrated, united theory (as opposed to a single discipline theory) that makes explicit efforts to identity the behaviors that predispose to negative health status within multidisciplinary and interdisciplinary frameworks. In this regard, Emry (2000) stresses that any theory on multi-problem behavior must, at least, utilize anthropological / developmental / evolutionary theory, resiliency theory, control (criminological) theory, neuropsychological theory, risk-protective factor medical theory, cognitive-behavioral theory, and public health theory to build a sufficiently powerful model. Jessor's theory-derived explanatory model of psychosocial risk has been shown to provide a substantial account of variation in the prediction of behavioral difficulties in adolescent samples in several countries, including China, and the United States (Jessor et al, 2003). Overall, the present findings provide preliminary support for the generality of Jessor's explanatory model to an Iranian sample of orphan adolescents, living in social and cultural contexts very different from those samples with which this theoretical model has been developed and tested in the past.

The articulation of basic types of risk—models, opportunity, and vulnerability proved to be very useful and offers a useful heuristic tool for future systematization of research. Assessment of those constructs, at both the individual level and in the key contexts of adolescent life, yielded theoretically relevant measures that were internally coherent, relatively independent, and significantly related to the SDQ behavioral difficulties

criterion. Most important, perhaps, is that the employment of such differentiated measures in this study made it possible to determine which types of risk were most important in accounting for variation in adolescent mental health, how these risk factors interact with each other, and whether gender was a moderating factor of risk and in with which types of risk factors it interacted with.

To begin with, assessment of descriptive statistics on major variables of the research indicate that the present sample of adolescents in terms of social-emotional mental health (SDQ total difficulties score), felt within the borderline classification, and about 25% of adolescents in the sample can be classified at the clinical cut-off, supporting the 'at risk' assumption and the *selective* and *indicative* nature of the present sample. In addition, gender correlated with low self-esteem and low expectations of success in life vulnerability and the composite index conformed by both scales. Boys obtained higher ADHD scores, age was correlated with models risk composite, model risk-peers, and model risk-adults at center, and adolescents living in foster centers located in the southern districts obtained higher ADHD scores; while, adolescents living at centers located in the eastern part of the city obtained higher scores on low self-esteem and low expectations of success in life and the composite index from both scales than those at centers in southern districts. These correlations are theoretically expected and practically significant.

In the present study, when psychopathological symptoms were measured with SDQ-total difficulties scores and the predictor variable consisted of composite risk indices, analyses of risk factors among orphan adolescents yielded very few (one contextual risk factor) significant results; however, when variables were decomposed, or when analyses were conducted separately for females and males, many more risk factors were predictive of behavioral and emotional difficulties. This is evidence that the selection of risk factors was largely successful.

The presence of signs of poverty in the neighborhood, a distal context factor, was undoubtedly the strongest risk predictor of total difficulties in the whole sample. This finding stands in stark contrast to Ford, Goodman and Meltze's (2004) finding who in their study about the child, family,

school, and neighborhood correlates of childhood psychiatric disorders, concluded that well known “risk factors” like deprived neighborhood were not directly associated with psychiatric symptoms, but rather these parameter acts distantly in the causal pathway or is irrelevant. However, data from numerous ecologically oriented studies indicate that crime, drug use, and other types of problems are more prevalent in high-density, poor urban areas (McLoyd, 1998) and that neighborhood monitoring (more common in deprived neighborhoods) is a significant predictor of early engagement in sexual activity (Smal1 and Luster (1994). The importance of the impact of distal variables, like neighborhood poverty, on mental health has been a much debated topic or research (Pickett & Pearl, 2001; Sellstrom & Bremberg, 2006; Truong, 2006). More recently, Goodman, Fleitlich-Bilyk, Patel & Goodman (2007) in a study designed to identify risk factors for poor child mental health in the southern Brazilian city of Taubate, found that both dimensional and diagnostic measures of child psychopathology (SDQ) were associated with dangerous neighborhood area among other child, family, peer, school variables.

When considering females and males separately (Table 3) the profiles of risk predictors were quite different from that obtained with the whole sample. For females, besides presence of signs of poverty in the neighborhood, other variables including age, vulnerability risk-stress and depression, and vulnerability risk-low self-esteem and low perceived life success (individual level variables), were significant predictors; while for males only neighborhood poverty main effects and one risk interaction (neighborhood poverty x vulnerability risk) predicted SDQ-total difficulties. These finding points to a possible etiological difference in individual trajectories for the development of emotional and behavioral difficulties of male and female adolescents (Ciccetti & Richters, 1993), while context risk and individual risk exert a direct effect among females, risk interactions play a significant role among males. Older age and female gender have been identified as variables associated with lower autonomy among orphan girls in a Middle Eastern country (Kurtz, Bunzell, & Nagler, 1993); thus, age among ophan girls has been found to represent a vulnerability factor.

When the predictor variables were decomposed into risk factor component sub scales, but still composite scale SDQ scores were used as the criterion variable, many more risk factor predictors reached significance. For instance, main effects are now observed for the presence of caregivers acting as model for undesirable risk behavior, presence of same age friends who do display risk behavior, and presence of individual vulnerability risk through depression, perceived stress and interpersonal (teacher) conflict. In addition, gender interacted with three risk factors: models risk-home, vulnerability risk-depression, and vulnerability-risk attachment alienation. Finally, even though the 'risk interactions effect' in Step 3 was not significant, two risk interactions reached significance, models risk- and opportunity risk-neighborhood poverty interacted with vulnerability risk-low self esteem and low perceived success in life.

When we decompose the criterion variable into specific disorders and the composite risk indices into risk factor subscales, a clear differentiation between emotional symptoms and conduct problems and between conduct problems and ADHD and peer problems is observed. Risk factors have about equal influence on emotional problems or internalizing pathology than externalizing pathology—when only conduct problems are considered. These results are in disagreement with previous findings regarding the differential prediction of risk factors in favor of internalizing problems reported in the literature (e.g., Dekovic, 1999). The present study predicted the internalized symptomatology by risk factors main effects, risk interactions and gender interactions. Neighborhood poverty and models risk peers, both context level risks, were positive predictors of emotional problems, while presence of risk models among caregivers and teacher stress were negative predictors. Positive predictions are expected and theoretically interpretable, however, negative predictors, and are more controversial, although not logically impossible. The results suggest that *peers* play an important role, as a risk factor, for development of internalizing problem behavior during adolescence. Especially the adolescent's association with deviant peers appears to be a potent risk factor for internalizing problems. Also, from late childhood to adolescence, factors outside the family become more salient predictors of problem

behavior (e.g., Patterson, Reid, & Dishion, 1992).

Results in terms of interactions indicate that, opportunity risk interacted with vulnerability risk, that is, context level and individual level risk have a joint effect in the prediction of emotional symptoms; and, gender moderated the effect of vulnerability risk--perceived stress/ depression, and attachment alienation; in other words, gender differences at individual level risk is of predictive importance. Given these results, our study does support the assertion that individual characteristics are important for internalizing problems, and suggest that individual characteristics are influenced by context level variables to exert a significant effect. Gender differences regarding emotional problems is a well recognized phenomenon in the literature and this finding in the present research adds to its validity. Depression and anxiety among orphan children should be considered a very important risk factor because extensive research suggest that former child welfare/protection young adults who visit clinics to receive psychological counseling are four to five times more likely than peers in the general population to have been hospitalized for suicide attempts. Furthermore, they are five to eight times more likely to have been hospitalized for serious psychiatric disorders in their teens, and four to six times in young adulthood. And finally, high excess risks are also present for psychoses and depression (Vinnerljung, Hjern, Lindblad, 2006).

The profile of risk prediction is notoriously different between conduct problems and ADHD, two kinds of externalizing symptoms. Practically, no significant predictors were obtained for ADHD; while a wide variety of risk factors were found to be involved in the prediction of conduct problem: foster center location and models risk, opportunity risk and vulnerability risk play an important role in prediction of conduct problems. When considering composite risk indices, models risk is significant, indicating that the additive and cumulative effect of models risk at home, from peers, at school and in the neighborhood is significant. This finding is in agreement with findings in numerous studies (Jessor et al, 1998; 2003; Greenberger et al, 2000; Kander, 1985; Oetting & Beauvais, 1987) which have obtained robust predictions about peer models risk, one of the most important types of risk for involvement in problem behavior in

adolescence.

Past research (e.g., Dekovic, 1999) has failed to find significant results between risk factors and externalizing symptoms. Perhaps the reason for this discrepancy lies in the measures used to assess externalizing symptomatology. There is the possibility that when conduct problems in normal adolescents is measured with instruments that do not explicitly consider conduct problems separately from other externalizing difficulties like ADHD or ODD, like the one designed by Noom, Dekovic, and Meeus (1996), as used by Dekovic (1999), these measures yield different results. Also, another difference of importance for considering this discrepancy is that in Dekovic's (1999) study, externalizing problems were reported by the adolescents themselves, which may have led to a low estimate of conduct problems; however, in the present study, conduct problems were evaluated by teachers.

Our finding with respect to the differential prediction of conduct problems and ADHD is of significance since these disorders are known to have different etiologies. In case of ADHD, Mash and Barkley (2001, p. 110) state that there is little doubt that this disorder may have multiple etiologies, and that neurological and genetic factors are likely to play the greatest role in causing it. Social factors alone cannot be supported as causal of this disorder, but such factors may exacerbate the condition, contribute to its persistence, and contribute to the forms of co-morbid disorders associated with ADHD Mash and Barkley (2001, p. 121). However, risk factors predictive of conduct problems are not only much more numerous but involve multiple levels, from intraindividual to family, school, peer, and neighborhood Mash and Barkley (2001, p. 171-172). In sum, it can be said that externalizing problems in the present study were better predicted by contextual factors than by the individual characteristics of adolescent.

For the purposes of the present study, it is important to refer to the fact that those children and adolescents who have a syndrome of hyperactivity disorder, known as hyperactivity-impulsivity-attention (HIA) simultaneously with a syndrome of conduct disorder (CD—and oppositional-defiant disorder, ODD) are at a higher risk of becoming

psychopathics in adulthood. Children high in HIA and CP are at a greater risk of showing an earlier onset of antisocial behavior in general, and of psychopathic tendencies, more specifically; showing antisocial behavior in higher frequencies and of greater severity, and show this pattern of antisocial behavior across situations (i.e., school and home) (e.g., Loeber & LeBlanc, 1990). Given that factor analytic results of the SDQ in this sample (see Methods section), did not yield a structure that is usually obtained with normal British children (e.g., Goodman, 2001) or Iranian children (Gharehbaghi & Aguilar-Vafaie, 1387), but rather yielded an antisocial factor, an accurate diagnosis based on individual profiles of these adolescents is warranted.

The specificity of risk factor effects on adolescent psychopathological symptoms, observed in the present study, is widely recognized in the literature (e.g., Ford, et al, 2004; Goodman, Fleitlich-Bilyk, Patel & Goodman, 2007). It appears that there may be some risk factors that contribute to a wide range of negative developmental outcomes (for example, neighborhood poverty), whereas other factors may be specific markers of increased vulnerability to specific problems (for example, low self-esteem for internalizing problems) and models risk for externalizing problems. Ford et al, (2004) found that no predictor variables were associated with all types of disorder. A selective association was obtained such that poor general health and life events were related to emotional disorders, while conduct disorders were most closely associated with family variables, and ADHD was only related to child characteristics.

Finally, the evidence found for the risk interactive effects in the present study was low in magnitude. These findings are similar to previous results reported with adolescents (Dekovic, 1999; Grossman et al, 1992). McClelland and Judd (1993) state that the statistical power to detect interaction effects is low because the interaction effect often operates in only small proportion of cases.

An important aspect of the present study is that information on academic standing, in particular about dropout status and grade point average of the participants was obtained. Among orphan adolescents, the tendency to fail in school and consequently drop out is more prevalent than

in normal populations and considering that the causal chain of multi-problem behavior clearly implicates school failure as a factor to be addressed (Embry, 2000), future studies will benefit very much not only from recording school failure but also obtaining information on academic performance and achievement.

Another salient strength in the present study is that different agents provided the criterion and the predictive variables, thus any significant results serve to supports the external validity of measures used. However, there are important limitations that need to be considered. First, the sample assessed is limited to an urban, governmental foster care center-based population, and generalizations beyond this population are not possible.

A second important limitation is the correlation nature of the research. Although some of the assessed risk factors predicted outcome, the causal relations between these factors and outcome are far from clear. The present study obtained measures at a single point in time and, therefore, the data cannot support any claims regarding the direction of effects. Future research will need to consider designs to evaluate complex causal linkages, confluence of factors, multiple causation, and transaction between environment and individual that mutually influences developmental outcome (Resnick and Burt, 1996) can be evaluated.

A further limitation inherent in all cross-national research is the possibility that, despite the care taken with the translation process, some of the measures could have different meanings for the Iranian adolescent respondents. Jessor (2003) states that the issue of the meaning equivalence of measurement across groups of different cultural backgrounds (and indeed even between any two individuals in the same group) resists easy resolution and cannot be ruled out entirely. He urges to provide evidence in support of equivalence by comparison across groups of the reliability coefficients of measures, as well as of their validity coefficients. In addition, the congruent pattern of explanatory findings in the samples, and for both genders, is a source of further reassurance about meaning equivalence.

Important practical implications derive from the present study. Above all, the findings of the present research can be incorporated into planning a

curriculum for orphan children and adolescents that address the needs of these vulnerable children. Secondly, the findings of the present study provide sound theoretical and empirical foundations, although preliminary in nature, for the design of *selected* and *indicated* interventional programs with orphan children and adolescents, considered high-risk group for suicide attempts and severe psychiatric morbidity. Moreover, this study, in line with Sellstrom and Bremberg's (2006) recommendations, suggests that interventions aimed at the social climate and physical conditions of underprivileged neighborhoods, can reduce health risk to children, especially when the individuals are lacking in resources, as it is the case with orphan adolescents; and, is in agreement with recent developments in conceptualizing mental health from an ecological perspective instead of an individual-based risk factor epidemiology paradigm (Pickett & Pearl, 2001). In fact, Truong (2006) concludes that current evidence suggests that efforts to improve mental health may be limited if only individual-level interventions are implemented and that a calculation of the costs and benefits of neighborhood-level interventions deserves more attention.

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