Adolescent girls in context:
Not all patterns may be created equal

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To cite this article:

Trost, K., El-Khouri, B., & Sundell, K. (2018). Adolescent girls in context: Not all patterns may be created equal. *Journal for Person-Oriented Research, 4*(1), 29-44. DOI: 10.17505/jpor.2018.03

Abstract

Much research exists on the importance of risk factors within individual contexts of parenting, neighborhood, school, and peers for adolescent development. However little exists on whether risks in certain contexts may be more or less likely for risk accumulation across contexts – referred to as the Weighted Risk Phenomenon (WRP). One way to study WRP is to study adolescent patterns of co-existing risk characteristics across domains and over time. The present study focuses on studying information about parenting, neighborhood, school, and peers in order to understand how risk can have different patterns over time. Participants were all girls recruited from junior high schools in rural and metropolitan areas of Sweden. The results illustrate that there are stable structural and individual pathways across four contexts of adolescent girls which may represent risk over time. Structurally, patterns which emerged at grade 7 reappeared again a year later and again a year after that in grade 9. In general, the same individuals seem to re-emerge in the same or similar patterns over time. Those who showed risk accumulation patterns tended to report prior risk factors in the parenting context. Such trends are supported in the literature and give support to the postulation that parenting is one of the strongest risk factors for adolescents. The findings indicate possible underpinnings of WRP.

Keywords: Adolescence, contexts, person-oriented, risk patterns

It is generally agreed that individual contextual factors, independent of whether they are distal (like the neighborhood one lives in) or proximal (like parenting), can influence individual adjustment over time. It is also generally agreed that each contextual domain (like school or peers) exposes the individual to a blend of risk factors specific to that domain. An increasing number of risk factors within a particular context like family, peers, school, or neighborhood often has been linked to cumulative models of risk (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Fergus & Zimmerman, 2005; Stattin & Trost, 2000). These studies illustrate how risk can accumulate and spread over time within and across contexts.

In the present study, we seek to understand co-existing contexts and how they may function over time by considering several major contextual factors simultaneously. By doing so, we focus on accumulation of risk over contexts. In the study, the four contextual factors under study are parenting, peer relationships, school, and neighborhood. These four contexts were chosen due to the abundance of findings supporting the importance of risk in these contexts. By risk factor, we mean that a factor that increases the likelihood of a negative outcome (Durlak, 1998). We start this introduction by a short review of some major findings that are relevant to this study and why these four contexts were chosen to be studied.

Parents

Most of the literature about risk in the family context has focused on parenting. One recurring conclusion is that quality of parenting is decisive for adolescent adjustment (Benzies, Keown, & Magill-Evans, 2009; Gauvain & Parke, 2010; Huston & Bently, 2010; Trost, Biesecker, Stattin, & Kerr, 2007). Varying levels of characteristics such as warmth, control, or communication have been definitively linked to pathways of maladaptive or adaptive parenting patterns (Barber, Stoltz, & Olsen, 2005; Maccoby, 2000). Indeed, it has been shown that variations in parenting are manifested by varying levels of such characteristics as parental warmth, open communication, and parental control which are thought to be key dimensions in many represented patterns of parenting (Baumrind, 1971; Steinberg & Silk, 2002; Trost, El-Khouri, & Sundell, 2015).

In terms of risk, parenting control behaviors or parental knowledge have been consistently linked to less behavioral problems, and low parental control has been linked to more problems in adjustment (Burke, Pardini, & Loeber, 2008; Hoeve, Dubas, Eichelsheim, van der Laan, Smeenk, & Gerris, 2009). These links have been found across genders (Hoeve et al., 2009; Laird, Criss, Pettit, Dodge, & Bates, 2008). Similarly, consistent and high levels of warmth and acceptance in parenting have been linked with positive adjustment, whereas inconsistent and low levels of warmth and acceptance have been linked with negative outcomes (Paley, Conger, & Harold, 2000; Steinberg & Morris, 2001; Trost et al, 2007). As a result, parenting behaviors has been noted as one of the strongest protective factors against problems as well as one of the strongest risk factors for problems during adolescence (Dishion & McMahon, 1998; Hoeve et al, 2009).

School

School has consistently been studied as a risk context. The importance of the school context for youth has been suggested by Emler and Reicher (1995, 2005). They posit that school provides a direct experience of institutionalized authority, and point out that adolescents spend much of their time at school; in turn, attitudes that adolescents have about school and teachers is a reflection of their general attitude toward authority. Negative attitudes to teachers have been strongly linked to antisocial behaviors, even more so than negative attitudes toward police (Levy, 2001). On the other hand, it has been found that involvement in school activities is associated with good adjustment in the form of higher self-esteem, lower delinquency and lower depressive symptoms (Fredericks & Eccles, 2010; Parente & Mahoney, 2009).

School has more often, however, been viewed as a risk factor particularly for minority students where school risk factors have been termed as part of the "school-to-prison pipeline" (SPP; Lerner & Galambos, 1998; Wald & Losen, 2003; Mallett, 2016). In fact, school risk factors have been identified as key elements in SPP especially for minority students (Lerner & Galambos, 1998; Wald & Losen, 2003; Mallett, 2016). Furthermore, in their meta-analysis of studies involving youth delinquency, Maguin and Loeber (1996) found that school based risk factors like poor academic performance predict delinquency. Their research findings suggest that school risk factors could foster cumulative risks, such as for example disciplinary practices (e.g., time-out, suspension) that remove the student from academic instruction. Exclusionary discipline practices, such as suspension, interfere with the educational progress and perpetuate a risk cycle and thereby likely decrease the student's opportunities (Costenbader & Markson, 1998).

In fact, the research on a school risk factor such as number of suspensions indicates that risk factors in school may accelerate problems outside of school (e.g., Civil Rights Project, 2000; McCord, Widom, Bamba, & Crowell, 2000). Not surprisingly, risk factors like being suspended from school have been reported to be major reasons for dropping out of school (Heilburn, Cornell, & Konold, 2017; Skiba & Noam, 2001). The outlook for youth who drop out of school is dismal, with dropouts composing 82% of the adult prison populations. Indeed, due to their institutionalized and structured nature, risk factors in the school context may function in unique manner over time when studied concurrently with other risk factors in other contexts.

Neighborhood

Another frequently and intensely studied context is neighborhood. Neighborhood risk factors are sometimes grouped structurally (e.g., low income, availability of drugs) and with respect to the social processes that take place in that context (e.g., informal social control, perceived neighborhood danger). Both structural characteristics and social process characteristics of one's neighborhood can put the adolescent at risk. Neighborhood risk factors like poor structure, feeling unsafe, and community violence have been linked to adjustment problems (e.g., Trentacosta, Hyde, Shaw, & Cheong, 2009; Gephart, 1997).

Due to their greater autonomy, in comparison with children, adolescents get increasingly exposed to the immediate environment, known as their neighborhood. If the exposure is positive, then the neighborhood functions as protection, but if the neighborhood exposure is problematic it functions as a risk for adolescent maladjustment (Borowsky, Widome, & Resnick, 2008; Brooks-Gunn, Duncan, & Aber, 1997; Molnar, Cerda, Roberts, & Buka, 2008; Sampson & Morenoff, 1997). In contrast to what one may expect, however, neighborhood risk characteristics in general may not increase the vulnerability to cross-accumulation of risk over time. In their study of juvenile offenders, Wikström and Loeber (2006) reported that neighborhood risk did not additively increase the likelihood for severity of offending or intensity of offending.

Peers

There is abundant literature on peer context and specific problem behaviors (Ennett, Bauman, Hussong, Faris, Foshee, & Cai, 2006; Prinstein & Dodge, 2008). Choice of peers has been shown to increase its impact on adjustment as children pass into adolescence (Brown & Larson, 2009). Friends become more important for adjustment since they may foster self-esteem and function as both cognitive and emotional resources for the adolescent (Hartup, 2009), sometimes with detrimental effect. For instance, Danielsson and colleagues (2010) report that teens who drink more tend to hang out with high alcohol consumers, and those who drink less tend to hang out with peers that drink less or not at all. Generally, peer risk factors such as negative affiliations have been linked to poor adjustment markers (Brown & Larson, 2009; Soldz & Cui, 2002; Poulin & Pedersen, 2007). With greater autonomy and less time with parents, peers are an important part of adolescent development.

Multiple context approach

It is without question that understanding patterns of risk during adolescence is important. Mapping patterns of risk during adolescence, however, is complex. Decades ago, Bronfenbrenner's (1977) ecological theory illustrated the importance of ecological contexts in terms of individual adjustment. Sameroff (2000) argued for the importance of transactional models pertaining to developmental theory in relation to risk. Both of their models focus on the individual in relation to context. For example, ecological theory emphasizes environmental contexts by viewing development in environmental systems including but not limited to the microsystem, mesosystem, exosystem and macrosystem. Such multiple and transactional theories go beyond a singular system and focus attention to connections between environmental systems such as family, peers, school, and neighborhood (Bronfenbrenner & Morris, 2006; Gauvain & Parke, 2010).

Within developmental theory, there are a plethora of studies which posit that functioning in one domain or context influences another domain or context over time. However, none seem to fully address whether certain risk contexts could be more meaningful for problem accumulation across contexts and over time than others. The cumulative transactions spread over time across domains and functions within a developing system. It is assumed that these transactions or interactions over domains influence the adolescent, but are these transactions equal? Some cumulative transactions are problematic and seem to continue throughout adolescence, while other cumulative transactions seem to be isolated to a certain domain.

This idea is not a new one and conceptualizations of cumulative problem processes have been put forward for decades, including the accumulation of problems of social functioning (Rönkä, Kinnunen, & Pulkkinen, 2000), developmental cascades (Masten & Cicchetti, 2010), and the snowball effect (Stattin & Trost, 2000) to name only a few. It is basically agreed that the accumulation of problems tends to aggregate to a small group of individuals and increases over time. What makes the progression of problems continue across domains or isolate to one domain however is less agreed upon.

Over the years, many have attempted to understand risk patterns over time by studying multiple contexts. For example, Meier, Slutske, Arndt, and Cadoret (2008) studied 85,000 children and adolescents. They reported a relationship between individual problem characteristics and neighborhood risk. Trentacosta and colleagues (2009) reported that dangerous neighborhoods and poor parenting had both additive and indirect effects on individual characteristics and antisocial behaviors. These studies however focus on a singular system or two developmental distal-proximal systems like neighborhood (distal) and parenting (proximal). Estévez and Emler (2010) did study multiple contexts like family, community, and attitude toward school but peer relationships were not included in their study. In their attempt to understand adolescents, Neumann and colleagues reported effects of risk in neighborhood and adolescent characteristics relationship to be mediated by risk in the parenting domain (Newmann, Barker, Koot, & Maughan, 2010). While looking at antisocial youth, Connell and colleagues (2011) reported that low risk characteristics in the parenting context were particularly important for youth functioning whereas being high on risk factors in the school and peer context could increase risk. This gives an indication that context does matter in terms of risk. Other studies have taken a multi-context approach but have omitted the developmental aspect. For example, in a national study of 14,000 youth in Britain and Scotland, risk factors were categorized into family, school, community, and individual domains (which included friends and peers; Beinart, Anderson, Lee, & Utting, 2002). These large sample studies however are not longitudinally designed and tend to confound contexts by factoring in socioeconomic status into the family-parenting context, as well as relationship with peers and attitudes toward school into the individual context.

In the present study, certain domains may be more weighted than others in terms of characteristics which can be associated to risk, which we refer to as the Weighted Risk Phenomenon (WRP). In other words, risk in one context may be more likely to spread to other risk characteristics in other contexts over time. For example, a risk in a single context may not be enough for the occurrence of contextual spread. Some contextual risks may simply be more likely to stay within that contextual framework, whereas others may more easily spread to other contexts. A risk characteristic in one single context, such as neglectful parenting or poor school adjustment, could be more weighted than risks in other contexts such as neighborhood.

In turn, the adolescent may be more likely to take on or accumulate more risk across contexts. This idea goes beyond the quantity and intensity of risk in a single context,

and implies rather that problems in certain contexts, whether distal or proximal, could have greater importance for the cross-contextual spread of risk over time. In line with *typical patterns* from a person-context perspective, or *attractors* in the dynamic systems approach (e.g. Bergman & Magnusson, 1997; Molenaar, 2004; Wiedermann, Bergman, & von Eye, 2016), the WRP phenomenon theoretically supports the idea that an array of patterns of risk characteristics across contexts could appear over time, but that some kinds of contextual risk change are more likely than others to be observed due to the weighted nature of certain contexts within adolescents' life experience. To our knowledge, although this idea has been theoretically discussed, it has not been empirically studied from a person-oriented and ecological standpoint across time.

The present study

Over two decades ago, Gottfredson and Hirschi (1990) noted that there seemed to be a general belief that there is one domain, most often poor family environment, which somehow causes a teen to end up being criminal or antisocial. Decades later, although the discussion and theorizing around multiple domain perspectives has grown, the same statement could be used to reflect the present state of empirical research in the area. Furthermore, Robins and Rutter (1992) noted the limitations of static approaches.

By encouraging the scientific study of individual pathways over time and across contexts, a greater understanding of individual development can be gained. We therefore see a need to study individuals with consideration to their contexts simultaneously rather than as separate domains. For example, early to middle adolescence is an important developmental period for the study of contextual risk factors, as adolescents spend increasingly more time in their communities and have increased opportunity for unsupervised activities away from parents (e.g., Leventhal & Brooks-Gunn, 2000; Trost et al, 2006). This interplay of contexts may be important to better understand adolescents at risk (Dodge, Coie, & Lynam, 2006). For these reasons, we have chosen the period of early to middle adolescence for our study. The goal of the present study is to examine contextual risk patterns over time from early to middle adolescence in girls. Due to the substantial findings indicating four prominent contexts linked with risk, we have chosen to study indicators in the contexts of parenting, peers, school, and neighborhood contexts.

In the present study, four constructs were included in our model. All four constructs were assessed three times. Most of the studies within one or across domains have been correlational. In recent years, longitudinal approaches have been used to study direct relationship between two domains over two points in time. For example, a popular approach is to use structural equation models (SEM) in order to study the interrelations amongst variables. However, although the SEM approach studies structural stability, most researchers do not consider individual stability and change over time when using this technique (Bergman & Trost, 2006). In the present study, the person-oriented approach is used to study individual and structural stability and change using multiple contexts over time.

Method

Participants

The participants were part of the longitudinal project 21 Swedish Junior High School Study (also known as SPAN), which includes youth from 21 junior high schools from rural and urban areas of Sweden. A total of 1236 boys and girls were asked to be a part of the project. All information gathered was based on adolescent reports. (For more information about the participants and project, see Sundell, Klint, & Colbiornsen, 2007).

It has been reported that male and female adolescents continue to be different in different contexts particularly during adolescence (Brown & Larson, 2002; Larson, Wilson, & Richman, 2009). For these reasons, the focus in the present study is based on the information gathered from the girls at 7th, 8th and 9th grades with complete information at all three time points. This resulted in 554 girls.

Drop-out should be avoided in survey studies for numerous reasons. To address the possibility of a biased sample, poor data quality, or systematic drop-out, we compared the means of girls in grade 7 who had incomplete data with those who had complete data. To check for potential selection bias due to selection criteria, univariate analyses of variance and chi-square tests were calculated for the sociodemographic variables and study variables. Those with less educated parents were under-represented among girls with complete responses. Girls with incomplete self-reports on the variables chosen did differ in regard to the sociodemographic variable of parent education, $\chi^2 (2, N = 602) = 3.12$, $p < .05$. The means of other demographic variables like family structure and study variables did not differ significantly.

It is important to note that imputation does not always provide better or clearer findings as was the case for our study. Based on careful consideration and following the aims of the study, it was decided that no data manipulation would be conducted in the present study.

Measures

Parents. Lack of parental warmth and parental control were used as indicators of risk. These scales have been used previously to illustrate parenting quality (Stattin & Kerr, 2000; Trost et al, 2007). The parental warmth scale consisted of four items rated on 5-point Likert type scales from "never" to "almost always". The questions posed were, "Do your parents give you praise when you do something well", "Do your parents encourage you and give you support", "Do your parents show with words and gestures that they like you", and "Do your parents notice when you do something well".

The parental control scale referred to parental regulations and constraints of their adolescent's free time and in the home. The scale consisted of five items rated on 5-point Likert type scales from "never" to "very often, always". The questions posed were, "Must you have permission from your parents to be out late on a weekday evening", "Do you know what rules you have at home?", "Do your parents react when you have broken one or several of their rules?", "If you go out on a Saturday night, must you tell your parents where you are going and who you will be meeting up with?" and "If you come home late an evening, do your parents require that you tell them what you did and who you were with?"

Cronbach's alpha reliability was .74, .82, and .80 respectively at grade 7, grade 8, and grade 9, for warm acceptance items. Cronbach's alpha reliability was .79, .78, and .78 respectively at grade 7, grade 8, and grade 9 for parental control items. Data treatment was conducted before analyses, so that data on warm acceptance and control were first trichotomized and then coded based on a 9-field table to represent a dimension from positive parenting to negative parenting patterns. Lower scores represented negative parenting/poor non-accepting and low parental control, whereas higher scores represented positive parenting or moderate to high parental acceptance and moderate to high parental control. The tertiary cut-offs were based on actual raw scores of parental control and parental warmth. This allows for each adolescent to be examined on two variables simultaneously.

Peers. The peer context was measured by looking at risky peer relations and poor peer relations. Risky peer relations were measured by youths' responses about their friends in terms of norm-breaking behaviors. The questions posed (referring to friends) were "Been arrested by the police", "Skips school regularly", "Fight", "Smoke tobacco", "Get drunk", "Use narcotics", "Steal", "Bully or harass others at school", "Are one or several years older than you", and "Have known you for at least a year."

Poor peer relations referred to youths' responses based on questions from the Social Competence with Peers Questionnaire (SCPQ; Spence, 1995). The questions posed were specifically "I have a close friend", " I have had my close friends for a long time", "It is easy for me to make friends", "Others in my class will work together with me", "Others invite me home", "Others invite me to their parties or ask me to come along to other things they do", "I am a close friend to others in the class", "I am popular among my peers", "I am with my friends during the weekends", " and "I invite my friends home".

Both response scales were based on a 4 point Likert type scale from 1 (describes me/friends very poorly) to 4 (describes me/friends very well). The Cronbach's alpha reliability coefficients for risky peer relations were .90, .90 and .89 respectively at grade 7, grade 8, and grade 9; and for poor peer relations they were .84, .90, and .91 respectively at grade 7, grade 8, and grade 9. High scores indicated high risk.

School. The school context was operationalized specifically as poor school involvement and poor attachment toward school. The questions posed for poor school involvement were "We participate in the planning of what we will do during lectures", "We decide together about the things that are important to us", and "Students' opinions and ideas are taken seriously at our school". The questions posed for measuring poor school attachment were: "In this school, I learn about many important things", "I feel comfortable at school", "I pay attention in class and to what the teachers say", "I look forward to my lectures", and "If I saw someone vandalizing at my school, I would tell someone at the school."

The risk school context questions were rated on 4-point Likert type scales from "disagree for the most part or completely" to "agree for the most part or completely". The Cronbach's alpha reliability was .72, .74, and .76 respectively at grade 7, grade 8, and grade 9 for poor school involvement and .72, .76, and .75 respectively at grade 7, grade 8, and grade 9 for poor school attachment items. High scores indicated high risk.

Neighborhood. Neighborhood context referred to both problem- and crime-prevalent neighborhoods and lack of informal social control presence in neighborhoods as risk factors. The questions posed for measuring problem- and crime-prevalent neighborhood context were: "Marks or illegal graffiti are common in the neighborhood?", "There are people who sell narcotics in the neighborhood", "During weekday nights, many drunk people are outside in the neighborhood", and "It is common that violent crimes (abuse, robbery, rape) occur in the neighborhood."

The questions posed for lack of informal social control in one's neighborhood context were: "When I am in the neighborhood, I meet adults that know me", "If an adult sees me doing something illegal in my neighborhood, my parents would find out", "Adults would interfere if someone openly tried to sell narcotics to a youth", "I know my neighbors' names", "Adults would interfere if there was a physical fight in front of my home", "If I was robbed publicly in my neighborhood, an adult would interfere", "My neighbors usually greet me when we meet", and "Adults in my neighborhood care about us children and youth."

The questions were based on a 4-point Likert type scale from "Disagree completely" to "Agree completely". Cronbach's alpha reliability was .78, .83, and .75 respectively at grade 7, grade 8, and grade 9 for problem- and crime-prevalent neighborhood items and .69, .81, and .83 respectively at grade 7, grade8, and grade 9 for poor informal neighborhood social control items. High scores indicated high risk.

Results

Table 1 shows the correlations between all included contextual factors from grade 7 to 8 and from grade 8 to 9. All correlations are significant at the 0.05 level except for that between school at grade 7 and environment at grade 8.

Before cluster analyses were conducted, residue analyses were conducted to see if any adolescents had a highly inconsistent and unmatching pattern across domains to any other individual in the sample. This resulted in 15 unique adolescents who were subsequently removed from the study across all time points in the present study. The LICUR technique using SLEIPNER 2.1 (Bergman & El-Khouri, 2002) was used to conduct cluster analyses (Ward's method and squared Euclidean distances) after removal of the residue. This was conducted in order to study different patterns of risk and protective contexts over time based on complete information provided by adolescent girls themselves. Separate cluster analyses were conducted for each grade to find homogenous subgroups. Then, structural stability and change of the solutions were studied in order to study the similarities as well as differences between solutions. Thereafter, profiles were linked over time to examine contextual based risk pathways. This resulted in an 11-cluster solution at grade 7, 8 and 9 which was chosen based on theory, Euclidean distances, subgroup size and homogeneity (Bergman, Magnusson, & El-Khouri, 2003). The classifications were significantly better than we had expected from analysing random data.

In Table 2, the characteristics of all 11 clusters at grade 7, 8, and 9 are presented, including means, standard deviations, cluster group homogeneity coefficients, and size. Structurally, stability and change of cluster solutions were examined by linking cluster structures between adjacent ages using the Centroid method where the Average Squared Euclidean Distance (ASED) indicates the degree to which two profiles are similar; lower ASEDs indicate higher similarity (Bergman et al, 2003). Scree plots were also used as a visual aid to assist in determining the appropriate number of homogenous clusters by looking at major gaps between cluster solutions as well as error sum of square values.

In Figures 1a-d, the centroid pairings of cluster solutions for grade 7 and 8 as well as grade 8 and 9 are shown graphically. ASEDs between grade 7 and 8 for clusters 1-9 ranged from .056 to 1.22, whereas ASEDs for clusters 10 and 11 were 2.90 and 3.16. ASEDs between grade 8 and 9 for clusters 1-9 ranged from .066 to 1.23 for clusters 1-8, whereas for clusters 9-11 the ASEDs were 2.42, 3.04, and 3.14. Once again and expected, the final clusters were the least similar. For the most part, however, the clusters were homogenous across grades and the explained error sum of square values (EESS) was relatively high (72.76%, 75.24 %, and 74.30%, respectively from grade 7 to 9) which indicates acceptable solutions.

Between grade 7 and 8 there was individual stability across the clusters and little change occurred. Individual stability was found for all paired profiles between grade 7 and 8 except for Cluster 3. Interestingly however, it was more likely than not that individuals from Cluster 2 at grade 7 would change to Cluster 3 at grade 8 ($p < .001$). Thereafter, individual stability remained for this group of individuals and they were more likely than not ($p < .001$) to remain in Cluster 3 in grade 9. Two other cluster changes did appear. Individuals from cluster 6 more likely than not ($p < .01$) changed to cluster 4 (a lower risk parenting context) in grade 8. Individuals in cluster 4 at grade 8 to 9 showed no individual change of group and individual stability ($p < .001$).

The other individual change ($p < .001$) from grade 7 to 8 was present for individuals in Cluster 7 moving to Cluster 10. This movement reflects a positive change from a cluster characterized by moderate risk in the peer context to a cluster characterized by very low risk in the peer context as well as one of the lowest risk clusters at grade 8.

Table 1.
Correlations and autocorrelations between contextual variables at grade 7, 8, and 9.

	Pa7	Pe7	S7	E7	Pa8	Pe8	S8	E8	Pa9	Pe9	S9	E9
Pa7	-											
Pe7	-.31	-										
S7	-.38	.32	-									
Ne7	-.09	.30	.17	-								
Pa8	.54	-.27	-.26	-.10	-							
Pe8	-.29	.41	.28	.23	-.30	-						
S8	-.26	.31	.52	.19	-.29	.35	-					
Ne8	-.11	.16	.07	.22	-.14	.26	.19	-				
Pa9	.46	-.23	-.26	-.12	.61	-.21	-.30	-.13	-			
Pe9	-.20	.36	.23	.26	-.28	.54	.29	.18	-.30	-		
S9	-.25	.21	.45	.11	-.21	.26	.52	.09	-.27	.35	-	
Ne9	-.12	.20	.14	.37	-.13	.25	.16	.23	-.09	.28	.15	-

Note. Pa7 = Parents Grade 7: Pe7 = Peers Grade 7: S7 = School Grade 7; Ne7 = Neighborhood Grade 7; Pa8 = Parents Grade 8: Pe8 = Peers Grade 8: S8 = School Grade 8; Ne8 = Neighborhood Grade 8; Pa9 = Parents Grade 9: Pe9 = Peers Grade 9: S9 = School Grade 9; Ne9 = Neighborhood Grade 9.

Table 2.
Cluster solutions by Grade Including Means, Standard Deviations, Homogeneity Coefficients (HC) and Cluster size (N)

Grade/Cluster	Parenting M (SD)	Peers M (SD)	School M (SD)	Neighbour M (SD)	HC	N
7/Cluster 1	2.05 (0.83)	4.46 (1.91)	4.87 (1.18)	3.89 (1.66)	4.24	63
7/Cluster 2	6.53 (1.44)	4.74 (0.63)	5.03 (0.52)	5.10 (0.66)	1.59	116
7/Cluster 3	7.07 (1.19)	3.11 (1.67)	4.89 (0.51)	1.91 (0.44)	2.33	85
7/Cluster 4	5.82 (1.64)	7.82 (0.95)	6.58 (1.77)	7.42 (1.35)	4.27	38
7/Cluster 5	7.09 (1.27)	1.70 (0.66)	4.87 (0.49)	5.04 (0.46)	1.25	47
7/Cluster 6	1.60 (0.68)	6.76 (1.57)	7.74 (1.55)	6.58 (2.11)	4.90	38
7/Cluster 7	7.64 (1.17)	3.62 (1.93)	1.31 (0.47)	5.02 (0.89)	3.06	45
7/Cluster 8	6.79 (0.86)	3.42 (1.17)	5.12 (0.70)	8.12 (0.65)	1.51	33
7/Cluster 9	5.90 (1.73)	4.60 (1.19)	8.47 (0.57)	4.17 (1.78)	3.96	35
7/Cluster 10	7.57 (1.29)	2.89 (1.57)	1.50 (0.58)	1.71 (0.60)	2.41	28
7/Cluster 11	6.38 (1.32)	7.85 (0.67)	5.19 (1.02)	4.19 (1.50)	2.75	26
8/Cluster 1	2.79 (1.23)	4.26 (1.02)	4.74 (1.28)	4.90 (1.14)	2.75	62
8/Cluster 2	6.08 (0.30)	4.79 (0.88)	5.02 (0.53)	4.96 (0.83)	0.91	137
8/Cluster 3	8.13 (0.68)	4.49 (0.82)	5.06 (0.53)	4.83 (0.83)	1.05	53
8/Cluster 4	6.10 (1.66)	8.41 (0.50)	8.09 (1.15)	6.95 (1.29)	3.00	32
8/Cluster 5	7.43 (1.10)	1.68 (0.56)	4.85 (0.42)	4.47 (1.30)	1.75	47
8/Cluster 6	1.55 (0.62)	7.39 (1.17)	6.26 (2.03)	6.32 (1.94)	4.83	31
8/Cluster 7	7.17 (1.20)	4.83 (1.02)	1.57 (0.50)	5.25 (1.19)	2.08	73
8/Cluster 8	6.58 (0.76)	4.50 (0.72)	5.00 (0.52)	7.96 (0.55)	0.84	24
8/Cluster 9	4.80 (2.07)	4.94 (1.12)	8.52 (0.51)	6.06 (1.50)	4.04	31
8/Cluster 10	7.41 (1.24)	1.48 (0.51)	1.52 (0.57)	4.97 (0.63)	1.26	29
8/Cluster 11	5.79 (1.18)	8.08 (0.58)	5.17 (0.48)	5.17 (1.01)	1.49	35
9/Cluster 1	2.10 (0.88)	6.10 (1.99)	4.81 (0.83)	5.62 (1.17)	3.39	42
9/Cluster 2	6.40 (1.22)	4.39 (1.10)	5.00 (0.50)	4.97 (0.63)	1.68	136
9/Cluster 3	6.79 (1.07)	3.99 (1.35)	4.98 (0.43)	1.65 (0.52)	1.72	89
9/Cluster 4	5.76 (1.05)	8.50 (0.56)	7.34 (1.68)	6.87 (1.44)	3.15	38
9/Cluster 5	2.73 (1.07)	4.51 (1.19)	3.54 (1.94)	2.39 (1.18)	3.85	41
9/Cluster 6	1.46 (0.51)	6.81 (1.50)	8.27 (1.08)	3.46 (2.06)	3.96	26
9/Cluster 7	6.95 (1.08)	4.50 (0.54)	1.67 (0.51)	3.06 (1.70)	2.30	60
9/Cluster 8	6.67 (0.96)	4.78 (0.75)	4.26 (1.40)	8.11 (0.42)	1.82	27
9/Cluster 9	6.45 (0.97)	5.06 (0.88)	8.39 (0.50)	3.39 (1.71)	2.31	33
9/Cluster 10	8.10 (1.08)	1.48 (0.57)	1.55 (0.51)	3.06 (1.71)	2.34	29
9/Cluster 11	6.55 (1.20)	8.06 (0.70)	4.48 (1.20)	3.76 (1.75)	3.22	33

Note: Parent=Parent context; Peers= Peer context; School=School context; Neighbor=Neighborhood context. Standard deviations are represented in parentheses after mean values for each cluster.

Across grade 8 and 9 there was individual stability across the clusters. There were two exceptions. The first was that individuals in Cluster 1 were more likely than not to change from cluster 1 (characterized by parental risk) to a cluster with similar parental risk and decreased risk in all other contexts (cluster 5), reflecting a possible WRP. The second was that individuals in Cluster 5 (low risk peers and fairly low risk parenting) changed to either a pattern of low neighborhood risk and moderate parent protection (Cluster 3) or to a pattern of continued low peer risk (Cluster 10).

Across grade 8 and 9, individual change was more abundant than before. Generally, when there was change found, individuals moved to a similar cluster representing a more moderate picture of their initial pattern (e.g., from Cluster 6 in grade 8 to Cluster 1 in grade 9). One trend specifically was negative. Individuals from Cluster 9 in grade 8 (marked by school risk specifically) seemed to take on two directions; either they continued to have only school risk a year later or they changed to increased problems in other areas (Cluster 4 and Cluster 6; *p* <.001 and *p* <.01 respectively), reflecting once again a possible WRP.

Discussion

In the present study, we found stable structural and individual pathways for four ecological contexts over time. It was shown that patterns that emerged in grade 7 appeared again a year later and yet again another year later in grade 9.
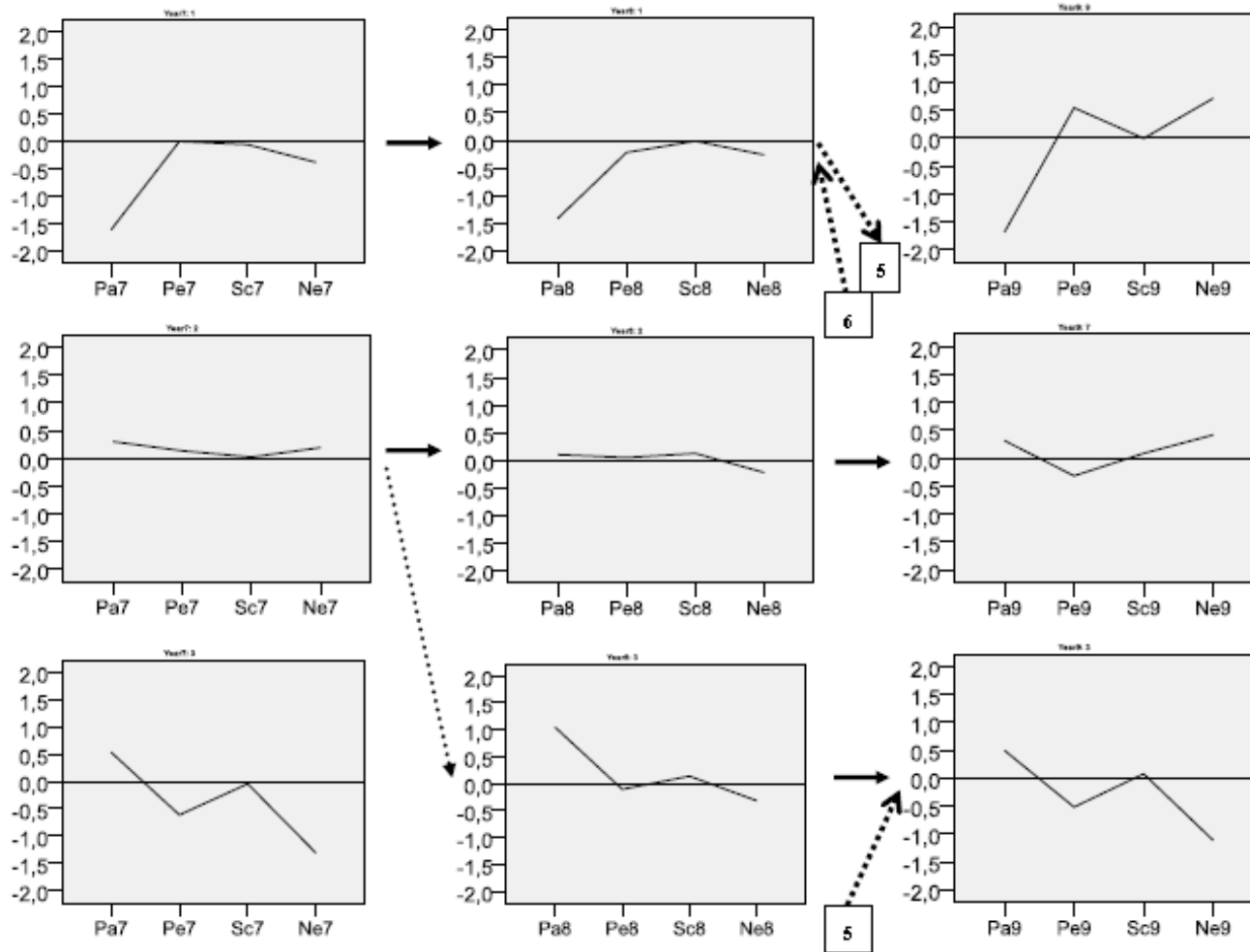
Figure 1a. Graphical representation of structural stability and change across grades for Clusters 1-3. Each graph represents plotted cluster means for matched cluster pairs across grades. Ne= Neighborhood, Pa=Parents, Pe=Peers, and Sc=School. Full lines across clusters represent individual stability between grades. Dotted lines across clusters represented individual change between grades.
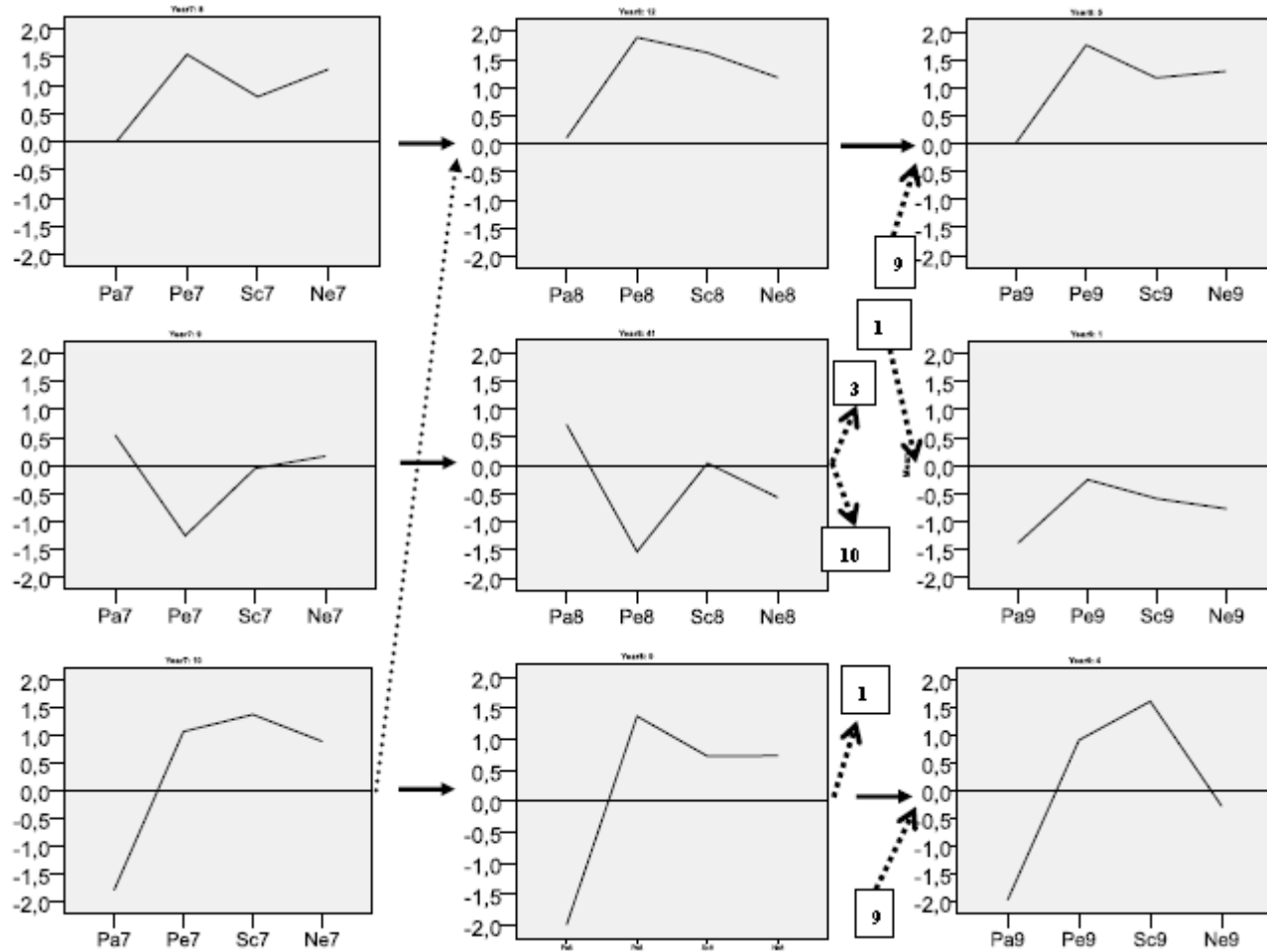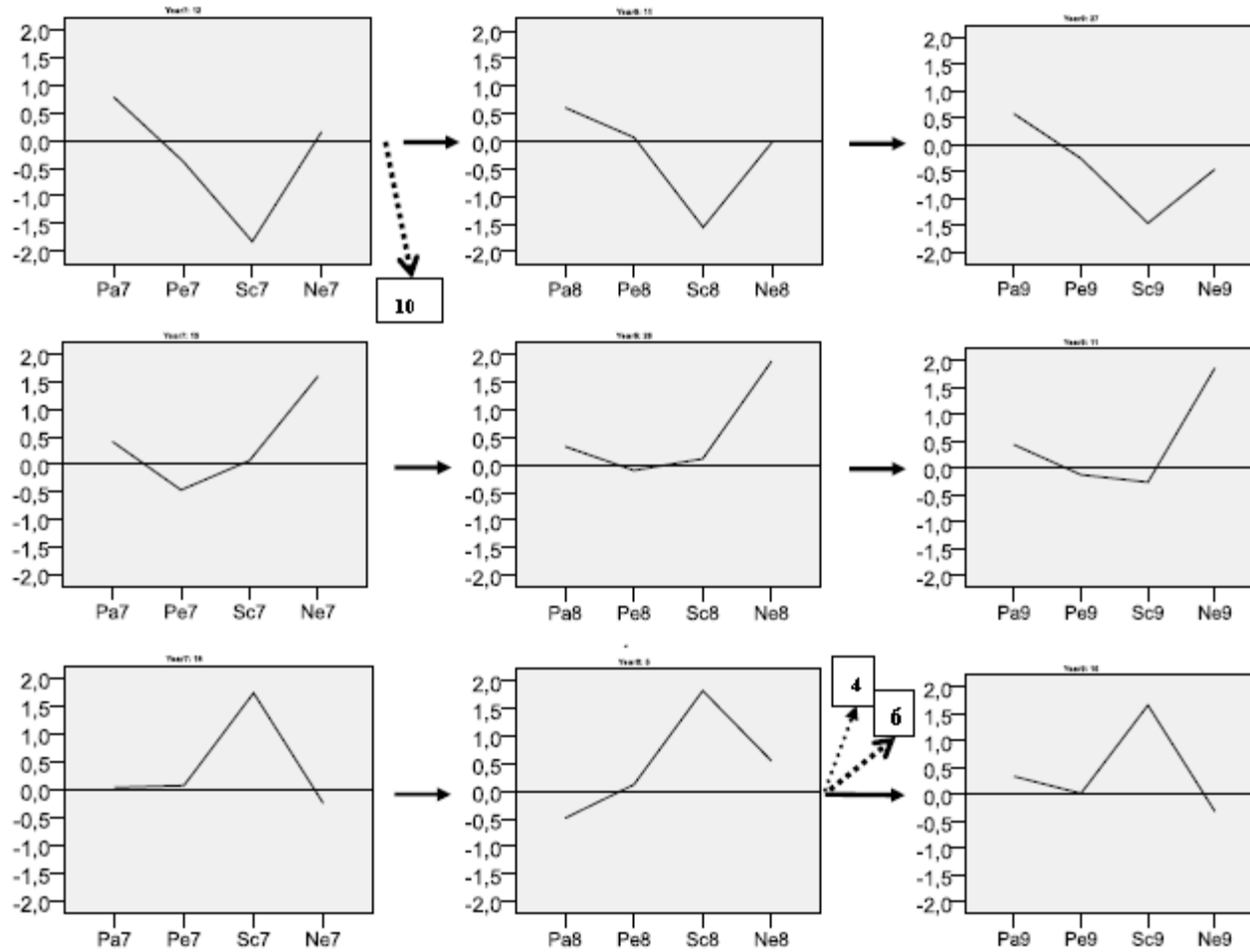
Figure 1b. Graphical representation of structural stability and change across grades for Clusters 4-6. Each graph represents plotted cluster means for matched cluster pairs across grades. Ne= Neighborhood, Pa=Parents, Pe=Peers, and Sc=School. Full lines across clusters represent individual stability between grades. Dotted lines across clusters represented individual change between grades.
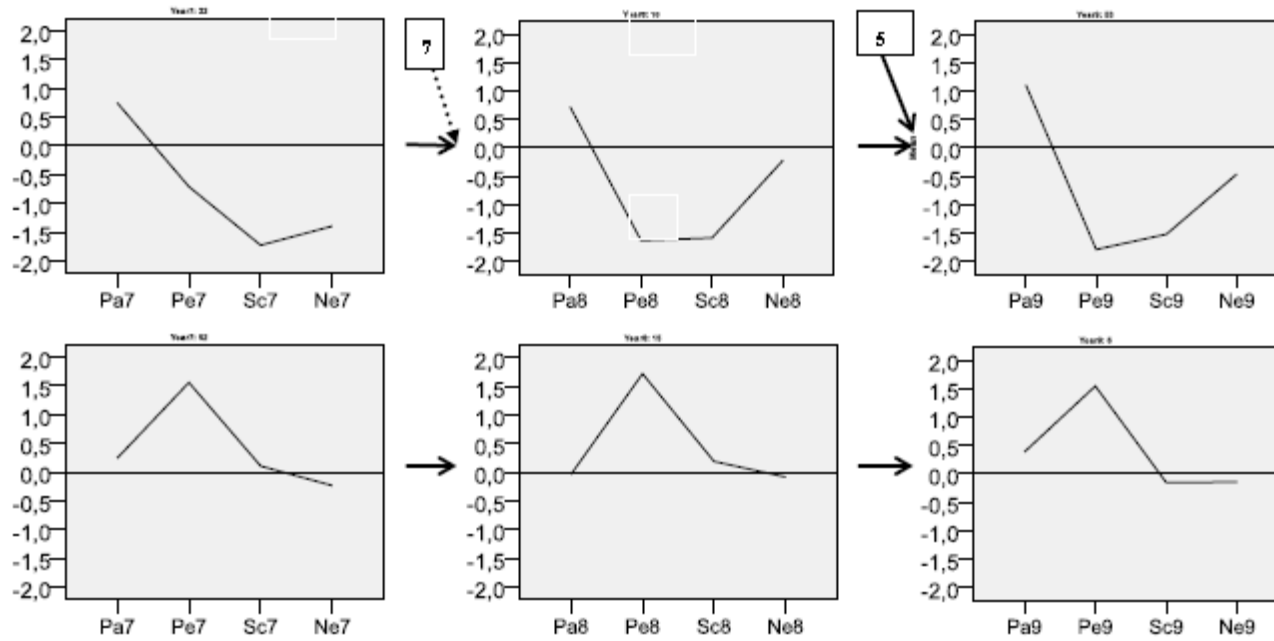
Figure 1c. Graphical representation of structural stability and change across grades for Clusters 7-9. Each graph represents plotted cluster means for matched cluster pairs across grades. Ne= Neighborhood, Pa=Parents, Pe=Peers, and Sc=School. Full lines across clusters represent individual stability between grades. Dotted lines across clusters represented individual change between grades.

Figure 1d. Graphical representation of structural stability and change across grades for Clusters 10-11. Each graph represents plotted cluster means for matched cluster pairs across grades. Ne= Neighborhood, Pa=Parents, Pe=Peers, and Sc=School. Full lines across clusters represent individual stability between grades. Dotted lines across clusters represented individual change between grades.

One of the most interesting findings was that the same individuals seem to re-emerge in the same patterns or similar types of risk patterns over time. It was twice more likely than expected by chance that individuals who are at low risk across contexts remained so 1 and 2 years later. Similarly, it was two times more likely than expected by chance that individuals who are at high risk in a particular context remained so 1 or 2 years later. Interestingly, there was a prominent stable pattern across time points (Cluster 8) that was characterized by high neighborhood risk. Individuals with this pattern in Grade 7 tended to continue to have high neighborhood risk in that context but not accumulate risk over time across contexts.

The findings are in line with the WRP. Two contexts, parenting and school, may be weighted for problem spread more than others like neighborhood and peers. Indeed, when individuals with the parental risk pattern at grade 8 (cluster 9) did change, they were found to be 3 times more likely than by chance to move towards a pattern of accumulated risk across contexts. Such trends are supported in the literature and support the hypothesis that parenting is one of the strongest risk factors for adolescents. When individuals with marked school risk at grade 8 (Cluster 9) did change, they were found to be 3 times more likely than by chance to move to a pattern with accumulated risk in other contexts. In the present study, individuals remain part of a risk school pattern or in many cases, accumulate risk in other contexts a year later. These findings motivate further study of the possibility that problems in school are not going away for girls. Such findings also give support to the idea that not all patterns of risk may be equal. Early problems in parenting and school domains may be indicators of greater accumulated risk over time.

There are limitations to the present study. As we focused on early-adolescent girls, no generalizations can be made about boys or other developmental periods. The purpose of the study was to capture the voice of girls specifically. Another reason to study girls only was due to research findings pertaining to gender differences in youth reports about parenting (Hawk, Hale, Raaijmakers, & Meeus, 2008; WHO, 2016), competence and peer relationships (De Goede, Branje, & Meeus, 2009; Geven, Jonsson, & van Tubergen, 2017; Haynie, Doogan, & Soller, 2014), school engagement (Wang, Willet, & Eccles, 2011; Demanet, Vanderwegen, Vermeersch, & Van Houtte, 2013), and neighborhood (Assari, Smith, Caldwell, & Zimmerman, 2015). Our study was limited to risk characteristics in four domains: peers, parents, school and neighborhood. In the present study, parenting indicators of warmth and control,

neighborhood indicators of crime and social control, peer indicators of risky peer behaviors and social competence with peers, and school indicators of involvement and attachment to school were chosen on the basis of previous literature. There are other contexts that could have been studied and the contexts themselves could have been studied in more depth with varied indicators. For example, there is a possibility that disclosure to peers, parents and teachers could have shed more light on the risk of these contexts. More specifically, disclosure in the parent-child relationship may have given more insight into the parenting context. Indeed, it has been found that adolescents who do not want parental involvement, but have parents that want parental involvement, are linked to poor adjustment in multiple contexts (Trost et al., 2007). The risk, however, would be that such information would also be confounded and embedded in each of the contexts which would then in turn, be a limitation. Yet another limitation in the present study is that the information is based on adolescent self-reports, which raises the issue of shared method variance. Since the questions are about the girls' own perceptions of their contexts, we believe that the reports give their own unique perspective.

Despite these limitations, we believe that the present study has merit. By studying both structural and individual pathways, we have added knowledge about patterns of individuals rather than patterns of variables over time. In so doing, we could study the stability and change of individuals from across three grades using multiple risk and protective contexts simultaneously across contexts. Although we found results in line with the WRP, further studies are needed. However, the findings from the study put focus on the importance of school and parenting early on in adolescence. Caution should be exercised when one assumes that problems in school or with parents will accumulate risks in other areas. Regarding WRP, the present study questions the assumption that one single risk is not a problem. It is important to know the pattern across contexts early on in order to look at the likelihood of risk accumulation over time.

Another important finding in this study is the differential importance certain patterns may have for risk accumulation across contexts. By studying adolescent girls, we found that not all patterns may be created equal when looking at risk across contexts simultaneously and over time. Indeed, all risk patterns may not encourage spread equally, as some patterns may be more typical over time and some may typically spread over to other contexts over time. For example, the findings in the study adds to the literature which suggests that studying the impact of the single characteristic of growing up in lower socioeconomic neighborhoods is limited in

understanding risk spread over time (e. g., Damm & Dustmann, 2014; Sharkey & Sampson, 2010; Sharkey, 2014). The present results suggest that it is not crime-filled neighborhoods per se which are effecting patterns of adjustment for adolescents, but rather the embedded social components of problems at school and problems with parenting that may be the prominent supporting actors for adolescents patterns of risk. The present study adds to policy debates on whether risks in one context, without considering WRP, is really predisposing youth for risk patterns in all areas of one's young life.

In sum, this study supports the relevance of the WPR phenomenon in understanding patterns of risk accumulation for girls during adolescence. It shows the significance of problem accumulation based on the WPR phenomenon. Future studies should shed light on the extent to which WPR can be observed and applied.

Declaration of conflicting interests

Funding

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