Are all Children affected by Abusive Parenting in the same Way? The Role of Shyness and Coping in Understanding the Effects of Abusive Home Context

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Abstract

Differential susceptibility hypothesis suggests that people with individual vulnerabilities are more likely to display poor outcomes when they are exposed to risks in their environment. Consistently, we examined whether youths with high levels of shyness and poor coping strategies are more susceptible to the negative effects of abusive home settings. The sample included data from 1025 7th and 8th grade students. Cluster analysis and MANOVA were used to analyze the data. The findings showed that both the home environment (non-abusive, verbally abusive father, and verbally/physically abusive parents) and individual vulnerabilities had main effects on the internalizing problems of youths independently. Only the interaction between home environment and high scores on shyness was predictive of higher failure anticipation and self harm. Overall, the findings therefore only suggested partial support for the differential susceptibility hypothesis.

Keywords: Differential susceptibility hypothesis, physical, abuse, internalizing
Are all Children affected by Abusive Parenting in the same Way? The Role of Shyness and Coping in Understanding the Effects of Abusive Home Context

Developmental psychologists have been interested in the consequences of different child rearing strategies for decades. This interest has led researchers to study both the incidences and consequences of different parenting styles (see Pluess & Belsky, 2010). One parenting behavior which has extensively been studied is child physical abuse. The reason for this may be the incidence and prevalence of physical child abuse not only in Sweden but all over the world. For instance, Swedish crime statistics from 2011 counted 19100 cases of physical child abuse among children aged 0-17 years (BRÅ, 2012). Findings from the USA have estimated that every eight child, before reaching adulthood, is exposed to some form of maltreatment (Finkelhor, Ormrod, Turner & Hamky, 2005).

Despite the laws protecting the right of children and aiming to stop child abuse, there are still numerous children and adolescents who are maltreated in their homes. Some of these maltreatments will be the focus of this study, as physical child abuse and parents angry outbursts will be investigated. In this study, we use the concept of physical child abuse to refer to parental physical violence toward children below 18 years of age. Moreover, in emotional abuse, parents inhibit and/or impair their children’s psychological and cognitive development by verbally, rather than physically, abusing them (Glaser, 2002). This study focuses on parents’ angry outburst because it may work as a marker for emotional abuse. Angry outburst refers to situations in which children, as a consequence of disapproving behavior, are verbally abused by either parent.

There is compelling evidence suggesting that exposure to traumatic experiences at home is associated with a number of negative outcomes. For instance, physical child abuse has been associated with internalizing problems such as depression (Johnson et. al., 2002; MacMillan, 2001; Margolin & Gordis, 2000; Moylan, Herrenkohl, Sousa, Tajima, Herrenkohl
& Russo, 2010; Mrug & Windle, 2010; Runyon et al., 2004) low self esteem (Margolin & Gordis, 2000) and anxiety (Margolin & Gordis, 2000; Mrug & Windle, 2010; Runyon et al., 2004). Similar internalizing problems have also been linked to emotional abuse, where depression, anxiety (Spertus, Yehuda, Wong, Halligan, & Seremetis, 2003) and low self esteem (Solomon & Serres, 1999) have been associated with this type of abuse.

The contextual risk factors, such as abuse at home, should not be considered independent of child characteristics. Different individual characteristics are also associated with internalizing problems. For instance, shyness has been associated with internalizing problems such as low self esteem (Nelson et al., 2008; Rubin, Coplan, & Bowker, 2009), social anxiety disorder (Biederman et al., 2001) and depression (Nelson et al., 2008; Rubin, Coplan, & Bowker, 2009). Similarly, children and adolescents’ styles and ability to cope with stressful situations are also linked to a number of internalizing problems. For example, emotion regulation has previously been linked to internalizing problems (Garnefski, Kraaij & van Etten, 2005) and has also been shown to work as a mediating factor for the interaction between temperament and adjustment problems (Eisenberg, Shepard, Fabes & Guthrie, 1998; Eisenberg et al., 2003). In sum, adolescents who are shy and with poor coping skills are more likely to display internalizing problems. These individual vulnerabilities may be aggravated by the presence of environmental risk factors. Adolescents with withdrawn tendencies and poor coping skills may be more susceptible to developing internalizing problems when they are exposed to abuse at home.

The aforementioned individual vulnerabilities, shyness and poor emotion regulation, are the central focus of this study. Shyness may be defined as the temperamental trait in which unpleasantness or even fear is experienced by individuals (Kagan, Reznick & Gibbons, 1989). When the term shyness is used in this study it is very closely related to Kagan, Reznick & Gibbons’ (1989) definition of shyness, as individuals are categorized as showing high scores
of shyness if they feel discomfort or even fear when being in social situations in which they are forced to interact with others (i.e. going to a party or raising one’s hand during class). Moreover, emotion regulation is achieved when individuals can adapt to social situations and achieve their goals through regulation of their emotions (in Feng, Shaw & Moilanen, 2011). More specifically, the term emotion regulation is in this study is related to the regulation of feelings of anger, whether adolescents react by controlling/ not controlling their emotion (i.e. do things they later regret) or hide their emotions of anger (i.e. trying to show feelings of anger).

These concepts are of importance in this study as they will be used to test whether some individuals are more strongly influenced by abusive home environments. In fact, a number of theories have been proposed claiming that some individuals are more susceptible to certain situations. Currently, the leading theory in this field are the diathesis-stress model of psychopathology (see Zuckerman, 1999) and the dual risk model of development (see Sameroff, 1983). Both these theories are grounded in the same idea that some individuals are more susceptible to stressors of the environment due to genetic or behavioral vulnerabilities. More specifically, individuals are born with risks which in association with the environment lead to negative outcomes (Ellis, Boyce, Belsky, Bakerman-Kranenburg, Van IJzendoorn, 2011).

For instance, based on this belief, individuals who show either poor coping or shyness and are exposed to a stressful environment will show negative outcomes due to the exposure of stress. A person with good coping skills or low scores on shyness, on the other hand, would not be influenced by this stressful situation. The diathesis-stress model emphasizes the belief that individuals are only vulnerable to stressful life events, as opposed to being more vulnerable or resilient to positive life events. In other words, when using the example from above, every individual would be equally affected by a positive situation regardless of
whether individuals show difficult or positive coping skills or high or low scores of shyness (Ellis et al., 2011). According to the diathesis-stress model, the negative outcome is caused through the interaction between environmental stressors and individual vulnerabilities. Therefore, neither the individual vulnerabilities nor the environmental stressors alone can explain the negative outcome, but merely the interaction of the two combined (Kendall, 2000).

Of special interest to this study is the differential susceptibility hypothesis. This theory claims, much like the dual risk model and the diathesis-stress model, that some individuals are more strongly influenced by environmental vulnerabilities than others. According to this hypothesis which was introduced by Belsky, individuals react very differently to both positive as well as negative life events. Belsky proposed in his hypothesis that individuals react differently to different situations because they vary in their susceptibility to certain life events. The hypothesis was inspired by an evolutionary perspective, according to which the main goal in life for all organisms, including humans, is to reproduce. The reproductive fitness of some organisms are challenged by natural selection which occurs over a long period of time where organisms are shaped to include certain valuable characteristics. Hence, natural selection is responsible for eliminating characteristics (i.e. physical characteristics) which are shown to no longer contribute to, but rather impair, perfect reproductive fitness in the future (Belsky, 2005).

Belsky applied this evolutionary perspective of natural selection to families by arguing that every parent had a child rearing strategy. According to the perspective of natural selection every parent adopts a parenting strategy that they believe will maximize the reproduction success of their children. Of course parents do not consciously decide which parenting strategy should be used to ensure that their genes will be passed along. Rather, a parenting style is chosen which parents unconsciously believe will benefit their children in
terms of reproduction. However, the chosen parenting strategy may later be shown to be unsuccessful in terms of achieving the ultimate goal of reproduction. Belsky argued that nature’s way of dealing with poor parenting strategies, hence leading to less reproduction, is by making children more or less susceptible to parenting styles. Thereby some children can reach reproductive fitness if they are not equally susceptible to, what is later learned to be, an undesirable parenting style. Hence, negative consequences would only be shown in children who are susceptible, rather than unreactive, to the unfavorable child rearing strategy. Belsky thereby argued that siblings would show very different susceptibility to both positive and negative child rearing strategies in order to protect their parent’s reproductive success. In other words, based on Belsky’s view, natural selection is the reason why humans, particularly within families, differ in their susceptibility to how they perceive child rearing (Belsky, 2005).

Although the differential susceptibility hypothesis and the diathesis-stress model may look very similar, there are a number of factors that distinguish them from one another. First, the differential susceptibility hypothesis proposes that both positive and negative life events can be experienced differently depending on whether a person shows individual vulnerabilities. In contrast, the diathesis-stress model highlights that only negative life events are experienced differently, and that environmental stressors trigger the individual vulnerabilities, which, in combination with the stressors, lead to negative outcomes. According to differential susceptibility hypothesis, there may be no or a weak direct association between a life event and outcome if the association is examined in the whole sample. However, the effect of life event would be observed in a different way for certain individuals with vulnerabilities. For example, exposure to negative life events, such as harsh parenting, may lead to more severe outcomes for youths with vulnerabilities, such as higher levels of shyness and poor coping strategies (Pluess & Belsky, 2010). On the other hand, the
diathesis-stress model would hypothesize that shy youths or those showing poor coping strategies would experience negative outcomes if they experience an environmental stressor such as harsh parenting.

A number of different researchers have had as an aim to test the accuracy of the differential susceptibility hypothesis in different areas. However, to date, there is only a limited body of research which has tested this theory in one way or another. Those which have tested it have mostly done this on infants or young children. For instance, one study tested the accuracy of the differential susceptibility hypothesis by investigating the interaction between childcare and temperament on problem behavior. The findings indicated that children with difficult temperament, as opposed to positive temperament, were more susceptible to parenting quality which thereby supported Belsky’s theory (Pluess & Belsky, 2009).

Similarly, support for the differential susceptibility hypothesis was provided when testing the interaction between temperament and childcare quality on school adjustment. The findings showed that those children displaying difficult temperament were more susceptible to both positive and negative child care compared to those children showing positive temperament (Dopkins Stright, Cranley Gallagher & Kelley 2008). Yet another study found irritable infants to be more susceptible to both positive and negative parent-child attachment styles than less irritable toddlers resulting in consequent sociability (Stupica, Sherman, Cassidy, 2011).

The aforementioned studies have shown great support for the differential susceptibility hypothesis. Many more similar studies like these exists showing support for the theory when looking at the interaction between childcare quality and children’s characteristics such as temperament and irritability on behavioral problems. However, this study is interested in the interaction effect between abusive home environments and the individual vulnerabilities, shyness and emotion regulation. Although there are not many studies which have investigated abuse in interaction with individual vulnerabilities, there are a few. For instance, Caspi and
his colleagues (Caspi et al., 2002) tested in their longitudinal study the possible interaction between boys showing low-activity monoamine oxidase A (MAOA) and experiencing maltreatment on their consequent expression of antisocial behavior. In fact, the researchers found that maltreated young men were much more likely to display antisocial behavior if they showed low rather than high MAOA activity.

Although these findings may look like support for the diathesis-stress model, the findings are more likely to be supportive of the differential susceptibility hypothesis. This is as Pluess and Belsky (2010) pointed out, the findings suggested that the least antisocial behavior was displayed by men who showed low MAOA activity and who had not experienced any maltreated. These findings indicated that instead of low MAOA activity representing a mere individual vulnerability, the influence of low MAOA activity and its outcome is dependent on its interaction with either a positive or negative environment.

There are several gaps and weaknesses related to the literature on the differential susceptibility theory. One weakness can be found in the fact that not many studies have tried to investigate whether the differential susceptibility hypothesis may be accurate. This means in practice, as suggested by Belsky, Bakermans-Kranenburg and van Ijzendoorn (2007) that many studies have failed to test the effects of child rearing practices in combination with child characteristics. This has resulted in plenty of evidence for the outcomes of child rearing as a main effect but little evidence regarding the interaction effects. In other words, studies like these do not take other factors into consideration and the findings in these studies therefore lack the great advantage of investigating multiple factors simultaneously to possibly reveal both main effects and interaction effects.

Furthermore, not only are there relatively few studies investigating this theory, but also, most that do test it are focusing on the age group of toddlers or very young childhood. This means that there is very little evidence about the accuracy of this theory in adolescence.
or adulthood. Although there are few studies which have tested the theory on adolescents, i.e. by testing the interaction between parenting and genes on alcohol and drug use (Beach, Brody, Lei & Philibert, 2010; Laucht et al., 2012), still much more knowledge is needed about this age group.

Moreover, although there is good evidence for the accuracy of the gene-maltreatment interaction, little is known about the impact of maltreatment and personality characteristics on internalizing problems. For instance, parents angry outburst and physical child abuse has never been used to test their interaction with the individual vulnerabilities shyness and emotion regulation. Hence, although the theory has received a lot of support from different studies, the areas which have been covered by these studies are very limited. Due to this, there is still much more to be learned about differential susceptibility hypothesis in order to fully find support for the theory.

The aim of this study is therefore to address some of the aforementioned gaps in the literature. This will be done by investigating whether the interaction between individual vulnerabilities and environmental vulnerabilities increase adolescents internalizing problems. In line with the ideas behind the differential susceptibility hypothesis, the following two research questions are put forward: 1) Are youths who show high scores of shyness, compared to individuals low on shyness, more strongly influenced by physically and verbally abusive home environments? Are the finding supportive of the differential susceptibility hypothesis? 2) Are adolescents who show problem coping, compared to non-problem coping individuals, more strongly influenced by physically and verbally abusive home environments? Do the findings show support for the differential susceptibility hypothesis?
Method

Participants

The current study made use of a sample which was taken from the longitudinal study the Seven Schools Study. The Seven Schools Study was carried out in a medium-sized city in central Sweden. Seventh to 9th grade students from seven different schools across the city were selected for the study in order to represent the socio-demographic characteristics of the city’s inhabitants. For four years students were surveyed during the spring semesters. The current study only used data from the first wave of the original study. The study sample consisted of 1025 youths in the 7th and 8th grade. The sample included 498 boys (48.6%) and 527 girls (51.4%), which ranged between the ages of 12 to 16 years (M=13.9, SD=.71). Most of the participants in the sample had a Swedish/Nordic origin (60.4%), lived in a two-parent household (62.5%) and had mothers (79.1%) and fathers (88.3%) who worked outside of their homes. Moreover, the familial financial situation was deemed, by the majority of youths (62.5%), to be similar to other families.

Measures

Abusive parenting behaviors

Physical abuse. Six items were used to determine physical child abuse during the past semester. The items differentiated between maternal and paternal physical abuse, hence each item was asking about maternal and paternal physical abuse separately. The items were phrased in the following way: Think about the past semester. Has the following happened? Has your mother/father: “Thrown things at you”, “Pushed, grabbed or shaken you hard?”, “Hit or slapped you”, “Kicked, bit, or punched you with their fists?” “Hit you with an object?” “Given you a beating?” The responses were coded as follows: 1=Never, 2= Sometimes, 3= Many times. A good inter-item reliability coefficients was observed for the items (α=.90 for mothers, α=.87 for fathers).
**Parent’s angry outbursts.** Five items were used to determine parent’s angry outbursts during the past semester. Each item differentiated between maternal and paternal parent’s angry outbursts, hence all items were asking about maternal and paternal behavior separately. The items were phrased in the following way: How do your parents react when you’ve done something that they really don’t like? “Becomes very angry and has an outburst”, “Has an outburst of anger and yells at you”, “Has a hard time controlling his/her frustration”, “Argues and complains in a loud voice”, “Shouts and argues with you”. The responses were coded as 1=Never, 2= Sometimes, 3= Most often. The items yielded a good inter-item reliability coefficients (α= .87 for mothers, α= .88 for fathers).

**Individual vulnerabilities**

**Social anxiety.** Social anxiety was determined using eight statements. Each statement represented school activities or leisurely activities in which social contact is required. The items were formulated in the following way: “Speaking in front of the class”, “Raising my hand during class”, “Making a phone call to someone I do not know very well”, “Being with classmates during breaks”, “Going to a party”, “Initiating a conversation with someone I do not know very well”, “Eating with others during lunch” and “Looking in someone’s eyes while speaking”. The responses were coded as 1=No fear, 2= Some fear, 3= A lot of fear. The items generated a good inter item-reliability coefficients (α= .80).

**Emotion regulation.** Five items were used to measure attempts of controlling emotion regulation. The items were formulated the following way: What happens when you get REALLY ANGRY with someone? “Do things I don’t want to do”, “Feel I have no control over myself” “Act aggressively, even though I don’t want to”, Do things I regret afterwards”, and “Feel I have to control myself”. An additional five items were used to measure attempts to hide emotion regulation. Those items looked the following way: What happens when you get REALLY ANGRY with someone? “Try not to show that I’m angry”, “Hide my feelings”,...
“Try to ignore my feelings”, “Keep the anger deep inside of me”, “Can´t think of anything other than the person I´m angry at.” The items were coded in the following way: 1=Don´t agree at all, 2= Don´t particularly agree, 3=Agree pretty well, 4=Agree completely. Good inter-item reliability coefficients was yielded through the items (α=.80 for poor coping, α=.79 for internalizing coping).

**Internalizing problems**

**Depression.** 16 items were used to measure depression in the past week. The items were formulated as following: During the past week: “I was bothered by things that usually don’t bother me”, “I did not feel like eating: I wasn´t very hungry”, “I wasn´t able to feel happy, even when my family or friends tried to help me feel better”, “I felt like I couldn´t pay attention to what I was doing (this week)”, ”I felt down and unhappy (this week) “I felt like I was too tired to do things (this past week)”, “I felt like things I did before didn’t work out right”, “I felt scared (this week)”, “I didn´t sleep as well as I usually sleep (this week)”, “I was more quiet than usual (this week)”, “I felt lonely, like I didn’t have any friends”, “I felt like friends (kids) I knew were not friendly or that they didn´t want to be with me”, I felt like crying (this week)”, “I was sad (happy this week)”, “I felt like people didn’t like me (this week)”, and “It was hard to get started doing things (this week).” The responses were coded as 1=Not at all, 2=Very seldom, 3=Now and then, 4=Often. A good inter-item reliability coefficients was produced by these items (α=.94).

**Self esteem.** Self esteem was measured using ten items. The items were formulated as follows: “On the whole, you are satisfied with yourself”, “At times you think you are no good at all”, You feel like you have a number of good qualities”, “You are able to do things as well as most other people”, “You feel you do not have much to be proud of”, “You certainly feel useless at times”, “You feel that you are a person of worth, at least on a equal plane with others”, “You wish you could have more respect for yourself”, “All in all, you are inclined to
think you are a failure”, and “You take a positive attitude towards yourself.” The responses were coded as 1=Don’t agree at all, 2=Don’t particularly agree, 3=Agree pretty well, 4=Agree completely. The items generated good inter-item reliability coefficients (α=.86).

**Failure anticipation.** Six items were used to assess failure anticipation. The items were formulated in the following way: “I don’t quite trust my ability to cope with difficult tasks”, “I think that difficult problems and tasks are fun”, “I easily become insecure when I face new tasks”, “It often feel like I shouldn’t even bother trying when I’m facing difficult tasks”, “Most of the time I believe I’m able to handle things, even quite difficult tasks”, and “The mere feeling that I can’t handle things makes me not do as well in school as I could.” The responses were coded as 1=Don’t agree at all, 2= Don’t particularly agree, 3=Agree pretty well, 4=Agree completely. A moderate inter-item reliability coefficients was generated by the items (α=.68).

**Self harm.** Ten items were used to measure self harm. The items were formulated the following way: Have you in the last six months…”Purposely cut your wrist, arms or some other part of your body”, “Purposely scratched yourself, for example with a sharp object, on your arms or some other part of your body so that it has started to bleed?”, “Purposely burnt yourself with a cigarette, lighter or matches?”, “Purposely carved words, pictures, symbols or similar onto your skin?”, “Purposely scratched yourself so badly that it turned into a wound, or started bleeding?”, “Purposely bitten yourself so hard that it punctured the skin?” “Purposely stuck sharp objects (like needles or similar) in your skin (Tattoos, earrings, needles for medical purposes do not count!)”, “Purposely hit yourself, or banged your head against something so severely that you have gotten a bruise?”, “Purposely prevented wounds from healing?”, Purposely hurt yourself in some of the ways described above so that it has lead to a hospital visit or that you have needed medical treatment?” The responses were coded
by the number of occurrences from never (0) to 5 or more times (6). The items yielded a good inter-item reliability coefficients ($\alpha=.93$).

**Procedure**

Before any data collection could take place, a number of individuals had to be contacted, including the municipal’s local education authority and all the schools managers, as they had to approve the study. Once the approval for the study was given, the data collection started. In order for youths to be allowed to take part in the study, both youth and parental consents were demanded. At this instant, youths were provided with all the information regarding their rights to withdraw or terminate their partaking in the study as well as their anonymous participation. Those individuals who chose not to be part of the study were given the option of an alternative activity whilst the other students answered the survey in class. The participants were, in the absence of their regular teacher, provided with the surveys by a trained research assistant. Apart from administering the surveys, the trained research assistants also had the task of reading the items out loud to individuals who showed challenges reading independently. Once the participants had answered the surveys, they received a small gift (i.e. pen or calculator) in gratitude for their participation. Since not all students were present the day the survey was initially administered, the same steps of data collection were taken one week later.

**Analysis**

In order to identify different types of home context, we used hierarchical cluster analysis with Squared Euclidian Distance and Ward method as the primary method of clustering (Ward, 1963). The number of clusters were decided based on the conceptual relevance of the groups and explained variance. It is commonly accepted that the final number of clusters should explain minimum 67% of the variance (Bergman et al., 2003). In cluster analysis, we used the mother and fathers verbal and physical abuse frequency as
indicators of clusters. The cluster analysis revealed three different groups of home environments, namely environments with: 1) no bad treatment, 2) an angry father, and 3) both physically and verbally abusive mothers and fathers. The three cluster solution explained 68% of the variance. The four cluster solution explained 69% of the variance, and very few cases were grouped into the fourth cluster (n = 10). Therefore, we retained the three cluster solution. Furthermore, this study investigated shyness and emotion regulation, where adolescents could either show high or low levels of shyness and poor coping. We dichotomized shyness and poor coping by median values. Thus, we obtained two groups for each of the constructs: low and high shyness; and low and high poor coping. The interactions between shyness, poor coping and abusive home environments were then assessed on the internalizing problems using multivariate analysis of variance (MANOVA).

Results

Exposure to abusive home environments and individual vulnerabilities

The descriptive analysis revealed that the majority of adolescents (60.3%) had not been exposed to any form of abuse, whether physical nor verbal in the past six months. However, nearly every fourth adolescent (23.2%) experienced paternal angry outbursts, and about every sixth student (16.5%) lived in an abusive home being exposed to angry outbursts and physical abuse.

Moreover, the descriptive analysis on individual vulnerability showed that many of the adolescents (40.5%) showed low scores on shyness and poor coping. Approximately every fourth adolescent showed high scores on poor coping (23.3%) and shyness (26.1%), whereas around every tenth student showed high scores on both poor coping as well as shyness (10.1%).
A moderate correlation could be observed for all the abusive parenting behaviors and adolescents internalizing problems. Furthermore, shyness and poor coping also showed a moderate correlation to the internalizing problems investigated (See table 1).
Table 1. Correlations, means and standard deviations for all of the variables. Inter-item reliability coefficients are presented on the diagonal.

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Note: Significant correlation at: * p < .05, ** p < .01. F refers to Father and M refers to Mother.
Interaction between shyness and abusive home environment on internalizing problems

The MANOVA models revealed a statistically significant main effect of abusive home environments on internalizing problems (F (7, 1252) =10.978, p < .001; Wilk's λ = .87, partial η² = .07. More specifically, a main effect was found for the home context on depression (F (2, 629) = 29.579, p < .001, partial η² = .086), low self esteem (F (2, 629) = 23.550, p < .001, partial η² = .070), failure anticipation (F (2, 629) = 8.150, p < .001, partial η² = .025) and self harm (F (2, 629) = 24.704, p < .001, partial η² = .073). Overall, youths in abusive home environments displayed higher levels of internalizing problems one year later.

An overall statistically significant main effect was found for shyness on the internalizing problems investigated (F (3, 626) =20.207, p < .001; Wilk's λ = .89, partial η² = .11). More specifically, shyness had a main effect on depression (F (1, 629) = 30.712, p < .001, partial η² = .047), low self esteem (F (1, 629) = 52.694, p < .001, partial η² = .077), failure anticipation (F (1, 629) = 51.342, p < .001, partial η² = .075) and deliberate self harm (F (1, 629) = 24.900, p < .001, partial η² = .038). In sum, shy adolescents displayed higher levels of internalizing problems.

The overall interaction between home context and shyness showed a statistically significant effect on the internalizing problems (F (7, 1252) =2.992, p < .003; Wilk's λ = .96, partial η² = .02. More specifically, there was an interaction effect found between the home context and shyness on failure anticipation (F (2, 629) = 5.209, p < .006, partial η² = .016) and deliberate self harm (F (2, 629) = 6.447, p < .002, partial η² = .020). However, the interaction of abusive home environment and shyness did not significantly increase depression (F (2, 629) = 1.174, p < n.s. partial η² = .004) nor low self esteem (F (2, 629) = 1.397, p < n.s., partial η² = .004, see Table 2). It can be concluded that the interaction between abusive home context and shyness significantly increased youths' failure anticipation and self harm but that no such observation could be made for self esteem and depression (See Figure1 and Figure2).
Table 2. The main effects of home environment and shyness, and test of interactions effects.

<table>
<thead>
<tr>
<th></th>
<th>Multivariate F-test Results</th>
<th>Univariate F-test Results</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>F (df)</td>
<td>p</td>
</tr>
<tr>
<td>Home context</td>
<td>10.98 (8, 1254)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
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<tr>
<td>Low self-esteem</td>
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<tr>
<td>Failure expectations</td>
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<tr>
<td>Self-harm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shyness</td>
<td>20.21 (4, 626)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Low self-esteem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure expectations</td>
<td></td>
<td></td>
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<tr>
<td>Self-harm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home context X Shyness</td>
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<td>.002</td>
</tr>
<tr>
<td>Low self-esteem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure expectations</td>
<td></td>
<td></td>
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<tr>
<td>Self-harm</td>
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<td></td>
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</tbody>
</table>

Note: The multivariate F-test is the Pillai’s Trace, with estimated degrees of freedom.
Figure 1. The interaction between abusive home environment and shyness on failure anticipation. (Abusive home refers to high scores of parental verbal and physical abuse).

Hence, the findings observed in this section indicated that being surrounded by an abusive home environment and being shy independently predicted all internalizing problems investigated. Moreover, even the overall interaction of abusive home environment and shyness showed a significant effect on internalizing problems. However, when each internalizing problem was investigated separately only failure anticipation and self harm were shown to be significantly increased by the presence of this interaction.
Post-hoc analysis, pairwise comparison across home environment

To test the interaction effect between abusive home environment and shyness a MANOVA was carried out using pairwise comparison. The findings on failure anticipation showed that individuals living in an abuse-free environment showing high scores of shyness were more likely to show failure anticipation compared to individuals with low scores of shyness ($p < .001$), with a mean value difference of $.518$. Similar findings were observed for verbally and physically abused youth, where the mean value difference of failure anticipation was $.604$ greater among individuals showing high scores of shyness rather than low scores ($p < .001$).

Moreover, the findings revealed that non-abused youths displaying high scores of shyness showed a mean value score which was $.144$ higher for deliberate self harm than individuals who showed low shyness ($p < .034$). Moreover, physically and verbally abused adolescents significantly differed in their scores of self harm, where shy individuals showed higher scores of self harm compared to individuals with lower scores of shyness ($p < .001$), with a mean value difference of $.594$. 

Figure 2. The interaction between abusive home environment and shyness on self harm. (Abusive home refers to high scores of parental verbal and physical abuse).
To sum up, the post hoc findings on the pairwise comparison across home environments indicated that youths who show high scores of shyness also experience more internalizing problems compared to those individuals with lower scores. This observation was made on youths living in non-abusive home environments as well as in verbally and physically abusive homes.

**Post-hoc analysis, pairwise comparison within shyness**

When looking at individuals with low scores of shyness, the post-hoc analysis revealed that individuals significantly differed in their scores on failure anticipation, where non-abused adolescents showed .224 less failure anticipation than those who had a verbally abusive father ($p < .001$). Moreover, individuals displaying low scores on shyness and who were not abused showed significantly lower scores of failure anticipation than physically and verbally abused individuals ($p < .001$), with the non-abused youths showing .228 lower means values.

Furthermore, shy individuals living in abuse-free homes showed .314 lower scores of failure anticipation in comparison to verbally and physically abused youths ($p < .008$). Similarly, shy individuals showed much higher scores of failure anticipation if they were verbally and physically abused by either parent rather than verbally abused by their father ($p < .001$), with a mean difference of .469.

Moreover, individuals with low levels of shyness significantly differed in their levels of self harm depending on whether they experienced no abuse or a verbally abusive father ($p < .026$), with the mean value being .124 higher for self harm in verbally abused adolescents. Similarly, individuals with low shyness showed much higher scores of self harm if they were physically and verbally abused rather than not abused at all ($p < .001$), with their means differing by .240.
The post-hoc tests further revealed that shy individuals displayed higher mean values for self-harm if they were physically and verbally abused rather than not abused at all (p< .001). Similar observations were made for shy individuals who were verbally and physically abused, as those individuals showed significantly higher scores of self-harm than those individuals who were exposed to paternal verbal abuse (p< .001), with their mean scores differing by .593.

Overall, the post hoc findings on the pairwise comparison within shyness indicated that the severity of internalizing problems is dependent on the abuse experienced in the home environment, where the worse the abuse the more severe the consequent internalizing problems. In other words, the findings suggest that those individuals who are not exposed to abusive environments show the least internalizing problems, followed by verbally abused individuals and those exposed to verbal and physical abuse by their parents. This is shown to be the case irrespective of the individual experiencing high or low levels of shyness.

**Relation between poor coping and abusive home environment on internalizing problems**

The MANOVA models revealed a statistically significant main effect of abusive home context on internalizing problems (F (7, 1108) =8.129 p < .001; Wilk's λ = .89, partial η² = .054). When looking at each of the internalizing problems separately, a main effect was found for the home context on depression, (F (2, 557) = 25.890, p < .001, partial η² = .085), low self-esteem (F (2, 557) = 13.912, p < .001, partial η² = .048), failure anticipation, (F (2, 557) = 6.655, p < .001, partial η² = .023) and self-harm (F (2, 557) = 18.242, p < .001, partial η² = .061). In sum, abusive home environments were related to all internalizing problems investigated.

When investigating emotion regulation, an overall main effect was found for poor coping on the internalizing problems (F (3, 554) =12.116, p < .001; Wilk's λ = .92, partial η² = .08). More specifically, a main effect was observed for poor coping on depression (F (1, 557)
= 29.148, p < .001, partial $\eta^2 = .050$), failure anticipation (F(1, 557) = 15.840, p < .001, partial $\eta^2 = .028$) and self harm (F(1, 557) = 19.576, p < .001, partial $\eta^2 = .034$). A close to significant main effect was found for poor coping on low self esteem (F(1, 557) = 3.622, p < .058 partial $\eta^2 = .006$). In sum, adolescents who displayed poor coping showed problems in almost all internalizing problems investigated.

When looking at the overall interactions between poor coping and abusive home environments on internalizing problems no effect was found (F(7, 1108) = 1.422, p < n.s.; Wilk's $\lambda = .98$, partial $\eta^2 = .01$). In other words, there was no interaction effect between poor coping and abusive home environment on depression, (F(2, 557) = 2.089, p < n.s., partial $\eta^2 = .007$), low self esteem, (F(2, 557) = 1.059, p < n.s., partial $\eta^2 = .004$), failure anticipation, (F(2, 557) = .628, p < n.s., partial $\eta^2 = .002$) nor self harm (F(2, 557) = 1.322, p < n.s., partial $\eta^2 = .005$). In sum, the interaction between poor coping and abusive home environments did not significantly increase youths internalizing problems (See Table 3).

The overall findings of this section thereby show that both abusive home environment and poor coping are independently linked to internalizing problems. However, the findings also show that there is no interaction effect between home environment and poor coping on increased internalizing problems. In other words, the internalizing problems are not increased due to the presence of both abusive home environments and individual vulnerabilities.
Table 3. The main effects of home environment and poor coping, and test of interactions effects.

<table>
<thead>
<tr>
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<th>Multivariate F-test Results</th>
<th></th>
<th>Univariate F-test Results</th>
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<tr>
<td></td>
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<td>( p )</td>
<td>( F (\text{df}) )</td>
<td>( p )</td>
<td>( \eta^2 )</td>
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<td>25.89 (2, 557)</td>
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<td>.09</td>
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<td>.268</td>
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Note: The multivariate F-test is the Pillai’s Trace, with estimated degrees of freedom.

**Discussion**

The aim of the current study was to examine whether adolescents differ in their susceptibility to different home environments depending on their individual vulnerabilities; scores of shyness and problematic coping. The current study posed two research questions: 1) Are youths who show high scores of shyness, compared to individuals with low shyness, more strongly influenced by physical abuse and parents angry outburst? Do the findings support the susceptibility hypothesis? and 2) Are adolescents who show problem coping, compared to non-problem coping individuals, more strongly influenced by physical abuse and parents angry outburst? Do the findings support the differential susceptibility hypothesis?
When looking at the first research question, whether shy individuals are more strongly influenced by abuse, the findings showed that abusive home environments were related to internalizing problems including; depression, failure anticipation, self esteem and self harm. Similarly, showing high scores of shyness was also linked to all of the internalizing problems investigated in this study. The interaction between abusive home environment and shyness on internalizing problems showed an interaction effect for self harm and failure anticipation. In other words, depression and self esteem did not significantly increase as a result of the interaction between abusive home environment and shyness.

Moreover, after conducting a follow-up analysis, the findings revealed that in nearly all cases investigated, youths who showed high shyness also showed more internalizing problems. More specifically, adolescents showed poorer scores of self harm and failure anticipation if they were shown to be shy. This was found to be true for nearly all cases, regardless of what type of abuse the adolescence had experienced or if he or she had not been abused at all. The only case at which this was found to be untrue was for adolescents who were exposed to paternal verbal abuse. Here, the severity of the internalizing problem of failure anticipation and self harm did not differ regardless of the scores on shyness.

Furthermore, the follow-up analysis also showed that there seemed to be a gradual increase in internalizing problems depending on the severity of abuse. Hence, individuals showed the least internalizing problems if they were not abused, followed by those who were verbally abused by their father and those who were physically and verbally abused by either parent. This trend was shown to be accurate irrespective of whether or not the individual was showing high or low levels of shyness.

The follow up analysis therefore showed that in general, individuals with high shyness show high internalizing problems and those with low shyness show low internalizing problems. Similarly, adolescents who experienced severe abuse (physical/verbal abuse)
displayed more internalizing problems compared to those who showed no abuse. The initial findings and the follow-up analysis therefore answer the first research question by showing that the differential susceptibility hypothesis could only be partially supported. This is as abused adolescents showing high shyness only displayed higher self harm and failure anticipation. However, even though the other internalizing problems investigated did not significantly increase in the initial analysis, the follow up analysis showed that there was a trend for more shy individuals with high abuse to show higher internalizing problems than those individuals with no exposure to abuse and low shyness.

When looking at the findings for the second research question, whether those showing high scores of poor coping are more affected by abuse, the findings again revealed main effects between abusive home environments and all internalizing problems investigated. Similarly, showing high scores of poor coping was related to the internalizing problems of depression, self harm, and failure anticipation. A near to significant main effect was found for poor coping on self esteem. However, none of the internalizing problems investigated in this study were shown to increase as a consequence of an interaction between abusive home environment and high scores on poor coping. In other words, the findings related to the second research question show no support for the differential susceptibly hypothesis as abused youth showing high scores of poor coping did not increase in internalizing problems.

The findings observed in this study are in accordance with previous research investigating main effects. When looking at previous findings investigating the association between abusive home environments and internalizing problems, the current findings are supportive of this link. This is as the current findings give even further support for the already grand literature finding a link between abusive home environments and depression and self esteem (i.e. Johnson et. al., 2002; MacMillan, 2001; Margolin & Gordis, 2000; Moylan, Herrenkohl, Sousa, Tajima, Herrenkohl & Russo, 2010; Mrug & Windle, 2010; Runyon et al.,
Moreover, it was also found that shyness was linked to all the internalizing problems investigated. This is also in line with previous studies which have found a link between shyness and internalizing problems, especially important to this study the relation between shyness and self esteem and depression (Nelson et al., 2008; Rubin, Coplan, & Bowker, 2009). Similarly, the current findings were supportive of previous research as they revealed emotion regulation to be linked to internalizing problems (Garnefski, Kraaij & van Etten, 2005).

However, when comparing the current findings to previous research investigating interaction effects only few findings are in accordance. This is as only the interaction between shyness and abusive home environment was predictive of higher internalizing problems including deliberate self harm and failure anticipation. These findings do not support previous research showing interaction effects in areas such as parenting styles and temperament (Dopkins Stright, Cranley Gallagher & Kelley 2008; Pluess & Belsky, 2009), or genetic vulnerabilities (Caspi et al., 2002). In other words, based on the findings obtained in this study, only little support for the differential susceptibility hypothesis could be given.

One explanation to why only partial support for the differential susceptibility hypothesis was obtained may be due to the way the constructs were measured. Although a good inter-item reliability coefficient was obtained for the items, the number of items included in every construct may have been too limited. Since the current study was based on data gathered in the Seven Schools Project which aimed at investigating multiple constructs simultaneously, the constructs were measured using only few items. In other words, had the constructs been based on more comprehensive measures had the risk for missing valuable information been reduced. This may have ultimately lead to different findings.

Although the different findings observed in this study can possibly be explained by the measurement of the constructs, the study nevertheless has a number of shortcomings. One of
these weaknesses can be found in the design of the study. This study only tested for negative environments instead of also taking into account positive environments which may work as protective factors. This can be seen as a weakness as it was previously mentioned in this paper that in order for evidence to be supportive of the differential susceptibility hypothesis it has to be both for positive and negative environments (Pluess & Belsky, 2010). Although the design of this study does not rule out that the findings can be supportive of the theory, it could possibly have been more supportive had positive environments been taken into consideration when looking at shyness and emotion regulation. Furthermore, apart from possibly providing further support for the theory, the inclusion of protective factors could have increased our understanding of positive parenting behavior both in relation to shyness and emotion regulation but also independently from those vulnerabilities.

Another shortcoming could be found in the methodology as only students were used as informants in the current study. Previous findings, using multiple informants, have found very different responses (Lewis et al., 2010; Litrownik, Newton, Hunter, English & Everson, 2003; Sternberg, Lamb, Guterman, Abbott, 2006). The findings obtained in previous studies therefore suggest that it cannot be ruled out that different informants are more likely to reveal different valuable information and that multiple informants are therefore needed to gather all necessary information. Due to this, the use of multiple informants, i.e. the use of parent and teacher reports, could have been beneficial in this study.

Another weakness could be observed in the design of the study. This is as the study only made use of data from one wave rather than multiple ones. This is a great shortcoming since the findings now only show the concurrent relations between abusive home environment, individual vulnerabilities and internalizing problems, rather than prospective findings also. In other words, it would have been highly valuable had multiple waves been
included in order to test the prospective findings as well as the analysis of change between these different time points.

However, although this study has a number of limitations, it also has great advantages. The greatest advantage of this study are its findings. This is as this study was able to increase our knowledge about the effects of shyness and emotion regulation. More specifically, shyness was found to be related to other internalizing problems which have not previously been tested, namely failure anticipation and self harm. Similarly, the findings on poor coping shed further light on the risk factors for developing internalizing problems by showing a relation to nearly all internalizing problems investigated. Furthermore, this study was also able to increase our understanding of the negative outcomes parents angry outbursts can have on adolescents. This is very valuable knowledge since although parents’ angry outburst may be a marker for emotional abuse, its negative outcomes may vary greatly.

However, the most important findings can be found in the interaction between abusive home environment and shyness and emotion regulation on internalizing problems. This is as Belsky, Bakermans-Kranenburg and van Ijzendoorn (2007) pointed out, that there are still few researchers which have investigated the interaction between different constructs. Although only two interaction effects were found in this study, for the interaction between abusive parenting behavior and shyness on failure anticipation and self harm, these nevertheless increase our understanding of the importance of testing for interaction effects. This is because merely studying main effect does not reveal the complete truth about the association between risk factors/protective factors on the outcome investigated.

Furthermore, another strength in this study can be found in its sample. A good sample was used as it included a large number of participants, using adolescents from families which, based on their socio-economical status, parental divorce and employment, did not significantly differ from other families. The sample was therefore ideal to test the research
questions at hand. Based on this observation it can be concluded that the findings obtained in this study can be representative of individuals in the same age group living in Sweden and that the findings can thereby be generalizable to this group.

Further research is needed in order to fully understand the impact abusive home environments and individual vulnerabilities have on adolescents. In order to gain a deeper understanding of the impact of individual vulnerabilities, shyness and poor coping should be tested further. Although there is good evidence supporting the differential susceptibility hypothesis, more research is needed in the area of abusive parenting in order to accept or dismiss the theory. Future research therefore needs to investigate abusive home environments in relation to shyness and poor coping in combination with positive parenting, making use of comprehensive measures, longitudinal data and multiple informants.

The findings in this study are of great importance. It was revealed that nearly 40% of all of the students were verbally and physically abused by their mothers or fathers at home. These are alarming figures which clearly show how great of an issue abuse in the home environment is in Sweden. Similarly, a very high percentage of students also suffered from poor coping (23.3 %) shyness (26.1 %) or both (10.1%). Considering that poor coping and shyness themselves are difficulties with which adolescents have to struggle, we have now even learned that these individuals are at an increased risk for developing internalizing problems. Due to this, it is of crucial importance that prevention programs are developed which reduce the likelihood for individuals to develop poor coping and shyness, hence reducing the risk for internalizing problems. Similarly, it is vital that parents are made aware of the negative outcomes abusive environments can have on adolescents and teach them, both before and after individuals have been identified as being abused, more prosocial parenting strategies.
References


