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Chaotic Home Conditions and Children's Adjustment: Study of Gender Differences

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Previous research evidence has shown strong associations between household chaos and children's behavioral and adjustment problems. However, the findings regarding gender differences in sensitivity to chaos are inconsistent. Therefore, the aim of the study was to study the gender differences in sensitivity to chaotic environment. Sample consisted of 150 primary school children (8-11 years) including 60 boys and 90 girls and their mothers. Data was collected form Rawalpindi (n = 101) and Lahore (n = 49). To measure home chaos Urdu translated version (Shamama-tus-Sabah & Gilani, 2008) of Confusion, Hubbub, and Order Scale-CHAOS (Matheny, Wachs, Ludwig, & Phillips, 1995) was used. To assess adjustment problems among children, teacher and parent rating scales of Behavioral Assessment System for Children-2 (Reynolds & Kamphaus, 2004) were administered. Children's scores on aggression and depression subscales were taken as indicators of their adjustment. Two-way ANOVA was run to assess adjustment problems among children from high and low chaotic families and to explore gender differences in reactivity to home chaos among children. Results indicated significant main effect of home chaos for adjustment problems among children. However, the interaction effect of gender and choas were found to be nonsignificant showing that impact of chaos was same for both boys and girls.

Keywords: home chaos, gender differences, reactivity to chaos, primary school children, aggression, depression

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Environmental chaos is an important aspect of children's physical microenvironment and refers to microsystem context high in crowding, noise levels, having less structured environment with less routines, and regularities (Wachs, 2010, 1989). Evidence supports the associations between such chaotic environments with children's poor cognitive ability (Evans, 2006), behavioral problems, poor academic achievement, low IQ (Deater-Deckard et al., 2009; Dumas, LaFreniere, & Serketich, 1995; Evans, Lepore, Shejwal, & Palsane, 1998; Supplee, Unikel, & Shaw, 2007), and with less effective parenting (Evans, Maxwell, & Hart, 1999; Wachs, 1979, 1993). Another interest which has been explored is gender differences among children in sensitivity to chaos; whether males and females react differently to environmental chaos?

Bronfenbrenners's bio-ecological model (1979) provides a comprehensive theoretical background to explain the links between chaos and adverse developmental outcomes among children. The model explains five interlocking systems (i.e., microsystem, mesosystem, exosystem, macrosystem, and chronosystem) in which microsystem refers to the immediate environment of the child such as home, daycare where they engage in proximal processes i.e., the interactions between the developing organism and persons, objects, and symbols in the immediate environment. Proximal processes for children's effective functioning require stable and consistent environments and home chaos may lead to negative outcomes by interfering with them (Bronfenbrenner & Evans, 2000). The second proposition of bio-ecological model further explains that proximal processes may vary in their form, content, direction, and power due to joint function of the different characteristics of developing person, context, etc. The proposition with acronym PPCT states:

"The form, power, content, and the direction of the proximal *processes* producing development vary systematically as a joint function of the characteristics of the developing *person*, the environmental *context*—both immediate and more remote—in which the processes are taking place, and the social continuities and changes occur over *time* through the life course, and the historical period during which the person has lived and, of course, the nature of the developmental outcomes under consideration (Bronfenbrenner & Evans, 2000, pp. 118-119)".

The model offers a board context that includes process, person, context, and time to understand the relationship between development and microsystem proximal characteristics such as environmental chaos (Wachs, 2010). The PPCT aspects of the bio-ecological model help to understand the nature of chaos and its relation with

development (Wach & Evans, 2010). The person dimension in PPCT framework refers to the concept of moderation — when the effect of microsystem characteristics (i.e. environmental chaos) varies systematically according to individual characteristic. Research has shown some characteristics (e.g. temperament) which act as potential or actual moderators, and gender is one of them (Wachs, 2010).

Gender has been found to have a moderating effect between variables such as density or crowding, stressful life events, parenting practices, environmental chaos and children's developmental outcomes, however, the results are inconsistent. Some of the researchers indicated that boys are more sensitive to microsystem chaos (Aiello, Nicosia, & Thompson, 1979; Matheny, 1991; Matheny & Phillips, 2001; Wachs, Gurkas, & Kontos, 2004), whereas, others suggested that girls are more adversely effected by chaos compared to males (Christie & Glickman, 1980; Hambrick-Dixon, 1998), still others have reported nonsignificant gender and chaos interactions (Evans, 2003; Evans, Lepore, & Allen, 2000; Haines et al., 2001). Nonsignificant interactions could be because of insufficient statistical power, or involvement of higher order interactions including chronological age as an additional person variable (Wachs, 2010). This inconsistent pattern of research findings cannot be conclusive and is a source of future investigation.

Evidence regarding various aspects of home chaos has also reported similar inconsistent findings. For example, boys have been found to be more affected by crowding as compared to girls (Aiello et al., 1979; Aiello & Thompson, 1980). Loo (1979) reported girls getting affected by high spatial density and feel more crowded as compared to boys. On the other hand, boys were reported to be more affected by high social density environment (Loo & Kennelly, 1979). These inconsistencies might be attributed to the age of the children, where crowding has more adverse affects on young as compared to older adults (Aiello, Thompson, & Baum, 1985; Evans, 1978).

Little evidence regarding the association between home chaos and children's adjustment is available in Pakistani context, similarly on gender differences in sensitivity to environmental chaos. Available evidence supports the associations between environmental chaos and lower academic achievement among Pakistani children (Shamama-tus-Sabah & Gilani, 2010; Quaid, Khan, Anwar, & Mateen, 2001). Keeping in view the earlier findings from western and nonwestern cultures including Pakistan, we intended to test whether children form high chaotic families will exhibit low levels of adjustment as compared to children from low chaotic families. To assess the level of adjustment we measured aggression and depression as indicators of

social and emotional adjustment (Schonert-Reichl, Lawlor, Oberle, & Thomson, 2009).

Middle childhood is the period when bullying, mood disorders, and disruptive behavioral disorders become more common problems. Aggression is one of the three areas of socio-emotional adjustment in which gender differences have been extensively reported. Severe conduct problems have been shown more common in boys as compared to girls. Research has also shown the role of both shared and nonshared environment in the development of behavioral problems among children (Eley, Deater-Deckard, Fumbonne, Fulker, & Plomin, 1998; Peterson, 1961).

We hypothesized that children who would score higher on these variables would be less adjusted as compared to those who scored low. We also wanted to see if gender moderates between home chaos and children's adjustment, and whether boys and girls react differently to chaotic conditions.

Method

Sample

The sample consisted of 150 primary school children (boys = 60; girls = 90) between the age of 8-11 years and their mothers (n = 150). The children were taken from Federal Government schools and data were collected from two cities of Pakistan, Rawalpindi (n = 101) and Lahore (n = 49). Given the increased urbanization in Pakistan the urban areas were selected (Haider & Badami, 2010). Rawalpindi and Lahore are the two most densely populated cities of Pakistan.

Sample was chosen according to the sampling criteria i.e. a) intact families with no case of divorce or separation; b) The number of children in each family should range from 2 to 7; and c) mothers were educated enough to be able to read and comprehend both Urdu and English language. We were unable to get permission from the copyright holder to translate the BASC-2 rating scales in Urdu language (the primary spoken language in Pakistan), therefore, restricted our sample to educated mothers. The teachers (n = 7) who taught the same children for more than a year were also included in the sample. They were requested to fill the teacher rating forms.

The mean income of the sample families was 12,000/- PKR per month. Since the families were reluctant to report their actual income the socio-economic index of the sample was calculated with the help

of the Economic Department of the Quaid-i-Azam University, Islamabad, Pakistan and was based on the household possessions of the families (Mumtaz & Salway, 2007; Winkvist & Akhtar, 1997). The index ranged from 1 to 100. The households lie between 0-25 was ranked as low social class, 26-74 as middle, and 75-100 as high social class. Out of total sample, 46.7% families (n = 70) were from low socioeconomic status (SES), 48.6% (n = 73) were form middle SES, and 10% (n = 7) were from higher SES. As expected we found significant positive correlation of socioeconomic index to both maternal education (r = .25, p < .01) and paternal education (r = .32, p < .01). The sample characteristics are presented in Table 1.

Table 1

Sample Characteristics (N = 150)

Variable	*M*	*SD*	Family % in each level
Boys' age	10.37	.61	-
Girls' age	10.22	.82	-
Mothers' age	38.06	5.32	-
Mothers' Education	13.61	1.28	-
Number of children (range = 2-7)	3.93	1.35	-
Family Income (PKR)			
<3000	-	-	1%
3000-10,000	-	-	70%
10,000-15,000	-	-	38%
15,000-25,000	-	-	23%
25,000-35,000	-	-	12%
35,000-45,000	-	-	5%
45,000>	-	-	1%

Measures

Confusion, Hubbub, and Order Scale - Urdu Version (CHAOS-U). It was originally developed by Matheny et al. (1995). It was designed to measure home chaos with satisfactory reported reliability (α = .79). The scale consisted of 15 items having true false format. Seven items were reverse scored to offset response set. The

total score was derived by summing up the individual responses. High score showed more chaotic conditions and vice versa. For the present study Urdu version of CHAOS with same scoring format was used. Satisfactory alpha reliability (.75) has been reported for the translated version (Shamama-tus-Sabah & Gilani, 2008). For the present study the alpha is .75.

Behavioral Assessment System for Children-2nd Edition (BASC-2). Parent and teachers rating forms of BASC-2 (Reynolds & Kamphaus, 2004) were used to measure levels of aggression and depression among children. BASC-2 measures various aspects of children's adjustment and behavioral problems. Parent Rating Scale (PRS) consists of 160 statements and Teachers Rating Scale (TRS) has 139 statements. TRS assess Externalizing problems (Aggression, Hyperactivity, Conduct Problems), Internalizing Problems (Depression, Anxiety, Somatization), School problems, and Adaptive Skills. PRS includes all the TRS scales except School Problems and includes a dimension 'activities of daily living' in subscale of Adaptive Skills that the TRS does not measure (Reynolds & Kamphaus, 2004). Satisfactory reliability and validity measures have been reported for both the parents and teachers rating scales (see manual for details, Reynolds & Kamphaus, 2004). In the present study, only two subscales Depression (Internalizing problems) and Aggression (Externalizing problems) were used as the test allows the use of separate subscales by providing individual scoring of different subscales. For the present study, the calculated alpha reliability of the subscales Aggression and Depression (PRS) were .78 and .67, respectively. For TRS subscales of Aggression and Depression, it was .85 and .68, respectively.

Procedure

The authorities of Federal Government schools were contacted first to get permission. School principals were also contacted individually to explain the objectives and purpose of the study. The permission letters were sent to parents through children explaining the purpose with a request to fill the form of basic information so that the sample can be selected according to the above mentioned sampling criteria. From Rawalpindi, 300 families were contacted, out of which 121 met the study criteria and 101 agreed to participate. For Lahore, out of 200 families, 55 met the criteria and 49 agreed to participate. The parents who agreed were again individually contacted through telephones to confirm their participation and to give them information

about the procedure. Mothers were contacted at their homes and were requested to fill the demographic form first and then CHAOS–U and BASC-2 PRS. TRS were given to teachers in their schools and were collected back after one week.

Results

To test both the hypotheses i.e. to see the affect of chaos on children's adjustment, and moderating role of gender, two-way ANOVA was used. Descriptive analysis was done first. The descriptive details are presented in Table 2. The intercorrelation among subscales (CHAOS scale), Aggression (both TRS & PRS), and Depression (both TRS & PRS) were computed and found to be moderate in magnitude ranging from .22 to .66 all significant at $p < .01$.

Table 2

Means and Standard Deviations of Children's Scores of Aggression and Depression on PRS and TRS from Low Chaotic and High Chaotic Families (N = 150)

		Aggression (PRS)	Depression (PRS)	Aggression (TRS)	Depression (TRS)
Gender	*n*	*M(SD)*	*M(SD)*	*M(SD)*	*M(SD)*
			High chaos		
Female	33	11.48(5.32)	12.52(5.21)	6.58(5.08)	5.55(4.09)
Male	31	13.94(7.06)	12.13(5.89)	9.26(5.69)	7.16(3.46)
Total	64	12.67(6.29)	12.33(5.51)	7.78(5.51)	6.33(3.85)
			Low chaos		
Female	57	7.89(5.66)	8.25(4.49)	3.54(3.99)	4.39(3.17)
Male	29	9.52(5.27)	9.07(5.13)	6.45(5.23)	4.45(3.17)
Total	86	8.44(5.56)	8.52(4.70)	4.52(4.62)	4.41(3.15)
			Total		
Female	90	9.21(5.78)	9.81(5.17)	4.66(4.63)	4.81(3.55)
Male	60	11.80(6.59)	10.65(5.70)	7.90(5.60)	5.85(3.56)
Total	150	10.25(6,23)	10.15(5.39)	5.95(5.27)	5.23(3.58)

The original CHAOS scale does not provide cutoff score to make a distinction between high and low chaotic families. Therefore, the

sample was divided into high and low chaotic families by median split (*Median* = 4) and the two groups were formed (Coldwell, Pike, & Dunn, 2006). High chaotic families were coded as 0 and low chaotic families were coded as 1. Gender was coded as 0 for females and 1 for males. High chaotic group had 64 families where as low chaotic group had 86 families. Two-way ANOVA was run separately for Parent (see Table 3) and Teacher rating scales (see Table 4). The two groups (high and low chaotic families) were also compared on maternal education, paternal education, and social class level. We found nonsignificant mean differences between the low and high chaotic families on maternal education ($t = 1.19$, $p = .24$), paternal education ($t = 1.07$, $p = .29$), and social class ($t = .28$, $p = .78$).

Table 3

F-values of Children's Scores on Aggression and Depression Subscales of Parent Rating Scale from Low Chaotic and High Chaotic Families (N = 150)

	SS	*df*	*MS*	*F*	*p*
		Aggression			
Corrected model	803.15[a]	3	267.72	7.86	.000
Intercept	16010.50	1	16010.502	470.26	.000
CHAOS	559.69	1	559.691	16.44	.000
Gender	144.78	1	144.784	4.25	.041
Chaos×Gender	5.98	1	5.98	.18	.676
Error	4970.72	146	34.046		
Total	21523.00	150			
Corrected Model					
		Depression			
Corrected model	546.62[b]	3	182.21	7.05	.000
Intercept	15364.11	1	15364.11	594.03	.000
CHAOS	468.84	1	468.84	18.13	.000
Gender	1.67	1	1.67	.07	.800
Chaos×Gender	12.77	1	12.77	.48	.483
Error	3776.15	146	25.86		
Total	19766.00	150			
Corrected Model	4322.77	149			

[a] *R* squared = .139 (adjusted *R* squared = .121)
[b] *R* squared = .126 (adjusted *R* squared = .109)

Results in Table 3 indicates significant main effects of home chaos and Gender on children's aggression as perceived by their

parents. Gender × Chaos term is nonsignificant. On depression subscale, home chaos is found to have a significant main effect, however, results reveal nonsignificant main effect of gender. The interaction of gender and chaos is also nonsignificant (see Table 3).

Table 4

F-values of Children's Scores on Aggression and Depression Subscales of Teacher Rating Scale from Low Chaotic and High Chaotic Families (N = 150)

	SS	*df*	*MS*	*F*	*P*
			Aggression		
Corrected model	689.36[a]	3	229.79	9.72	.000
Intercept	5820.69	1	5820.69	246.23	.000
CHAOS	297.81	1	297.81	12.59	.001
Gender	272.38	1	272.38	11.52	.001
Chaos×Gender	.431	1	.431	.02	.893
Error	3451.31	146	23.64		
Total	9457.00	150			
Corrected Model	4140.67	149			
			Depression		
Corrected model	177.24[b]	3	59.08	4.97	.003
Intercept	4049.42	1	4049.42	340.75	.000
CHAOS	130.87	1	130.87	11.01	.001
Gender	24.58	1	24.58	2.07	.153
Chaos×Gender	21.06	1	21.06	1.77	.185
Error	1735.06	146	11.88		
Total	6010.00	150			
Corrected Model	1912.29	149			

[a]. *R* squared = .166 (adjusted *R* squared = .149)
[b]. *R* squared = .093 (adjusted *R* squared = .074)

In Table 4, on TRS main effects of home chaos and gender are significant for children's aggression score, however, Gender × Chaos term is nonsignificant. On depression scale the main effect of home chaos is significant. Both the main effects of gender and Gender × Chaos term are nonsignificant.

Regarding our second hypothesis we found nonsignificant Gender × Chaos interaction for all four scales. It indicates that impact of chaos was similar for both male and female children and gender

was not found as having a moderating effect between chaos and children's adjustment.

Discussion

The goal of the present study was to assess the impact of chaos on children's adjustment and to study the gender differences in reactivity to chaotic environment among Pakistani primary school children. Our results support the earlier findings conducted in western developed countries. Regarding our mean CHAOS-U Score which is 4.05(2.91) it can be argued that most of the families were less chaotic in the sample. However, the comparison was done between the mean CHAOS-U score of our sample with the mean scores of those studies conducted in US (Coldwell et al., 2006; Corapci & Wachs, 2002; Matheny et al., 1995). We found our mean score as higher with greater variance than those studies conducted in western cultures. In addition the same pattern of results between chaos and children's adjustment further supports the internal consistency of our instrument.

Regarding our first objective we found significant mean differences between children from high and low chaotic families on their aggression and depression scores. The children from chaotic families were perceived as high on depression and aggression both by their parents and teachers. The nonsignificant differences between low and high chaotic families on parents' education and social class and independent ratings of teachers further support the adverse effects of chaos on children's adjustment. These findings are in line with previous studies showing strong positive associations between chaos and children's behavioral problems (Atzaba-Poria & Pike, 2008; Coldwell et al., 2006; Corapci & Wachs, 2002; Dumas et al., 2005; Evans, Lepore et al., 1998) while simultaneously supporting our first hypothesis (Andrade et al., 2005; Dumas et al., 2005; Evans, Bullinger, & Hygge, 1998; Evans, Hygge, & Bullinger, 1995) and clearly explain the importance of regular routines and structured environment for children's development. Consistent findings indicate links between frequency of family mealtimes with children's positive outcomes, including reduced smoking, less mental health problems, reduced alcohol, and sexual risk taking (Compan, Moreno, Ruiz, & Pascual, 2002; Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004).

Our results regarding the hypothesis of gender moderation are nonsignificant indicating similar adjustment outcome of boys and girls towards microsystem chaos. Research studies addressing moderators

of environmental chaos particularly gender moderation has reported inconsistent findings. Some studies has reported females as more affected by chaos and still others have reported nonsignificant Gender × Chaos interaction (for review see Evans & Wachs, 2010). Similarly, studies regarding impact of density and crowding on children's outcome have presented differential affects for boys and girls.

Loo (1978) compared the results of her three studies involving children of five and ten years old and concluded that effects of density diminishes with age. The crowded environment resulted in more physical aggression, distress, and negative effect for younger children as compared to older ones. The older children showed more avoidance of each other to handle the situation. These findings suggest that crowding is more detrimental for young children and are consistent with Evans' (1978) view who after review concluded that crowding results in more adverse affects for young as compared to adult organisms. One possibility of differential male and female sensitivity to chaos is the involvement of higher order interaction, age being one of them. Previous findings have indicated age as further moderating this differential sensitivity being males more sensitive to chaos in preschool and infancy (5 of the 6 studies, Wachs, 2010) and waning sex differences thereafter, three of the four studies report nonsignificant gender × chaos interactions having preschool or elementary school age children or adults and two studies indicate females as more sensitive involving kindergarten or school age children (Wachs, 2010). Our results showing nonsignificant gender × chaos interactions among school age children are consistent with these findings.

Our results showing main effects of gender on aggression subscale are consistent with earlier findings. Men/boys have consistently been shown as more aggressive than girls (Bosson, Vandello, Burnaford, Weaver, & Wasti, 2009; Lightdale & Prentice, 1994). However, our results did not show main effect of gender on depression which is again in line with previous evidence indicating that gender differences on depression emerge in mid-puberty (Angold, Costello, & Worthman, 1998; Hankin et al., 1998; Oldehinkel, Wittchen, & Schuster, 1999). Moreover, research shows that before age 11 boys are more depressed than females (Costello, Mustillo, ErKanli, Keelen, & Angold, 2003; Hankin et al., 1998). Our results have also indicated boys as slightly high on depression scores as compared to girls. However, these effects should be interpreted independently of chaos and might be attributed to various other variables such as temperament, parental depression, stressful life

events, etc. (Charbonneau, Mezulis, & Hyde, 2009; Oldehinkel, Veenstra, Ormel, De Winter, & Verhulst , 2006).

Conclusion, Suggestions, and Limitations

The results indicate that children from high chaotic families exhibit more aggression and depressive symptoms as compared to children from low chaotic families as reported by their parents and teachers. In addition, the effects of home chaos were similar for boys and girls. Our results are inline with previous findings from western cultures, and have widened the literature by adding the findings from non western developing country, Pakistan. Although the generalizibility of our results is limited as per small sample and inclusion of educated mothers only (12^{th} to 16^{th} grade education), however, it highlights the importance of family functioning at microsystem level and provides a valid research question to study the impact of chaos on children from educated families. Given the issue of increasing population and urbanization in Pakistan, it may have affected the microsystem characteristics such as noise pollution, number of persons living per home or room, which are needed to be addressed. Moreover, the inconsistent results regarding gender sensitivity is another source of future research to test the hypothesis of greater male sensitivity in early years as compared to females particularly in Pakistani culture.

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