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Mama's Boys and Nature's Girls: Explaining Differences in Risk Attitudes Between Women and Men

By NaRita Anderson, Fred Fernatt, Robert Rodermund, Ron Sages & John Grable

Kansas State University

Abstract - Extensive research shows that men report greater enjoyment and excitement from taking risks than do women. What remains to be answered is why women seem to exhibit risk attitudes that are less aggressive than men. In this paper, we apply aspects of power-control theory (PCT) as a theoretical foundation for explaining generalized risk-taking attitudes among women and men. We investigate the role of socialization from mothers in shaping the risk attitudes of their children. Using data from the NLSY, mothers were found to have little influence on the risk attitudes on daughters, although mothers' SES may impart a profound influence on sons' risk tolerances. It was also noted that children's personality trait profiles were positively associated with their risk attitudes although the effects for boys differed from those of girls.

Keywords : risk attitudes, gender, power control theory, socialization.

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Mama's Boys and Nature's Girls: Explaining Differences in Risk Attitudes Between Women and Men

NaRita Anderson ^α, Fred Fernatt ^σ, Robert Rodermund ^ρ, Ron Sages ^ω & John Grable [¥]

Abstract - Extensive research shows that men report greater enjoyment and excitement from taking risks than do women. What remains to be answered is why women seem to exhibit risk attitudes that are less aggressive than men. In this paper, we apply aspects of power-control theory (PCT) as a theoretical foundation for explaining generalized risk-taking attitudes among women and men. We investigate the role of socialization from mothers in shaping the risk attitudes of their children. Using data from the NLSY, mothers were found to have little influence on the risk attitudes on daughters, although mothers' SES may impart a profound influence on sons' risk tolerances. It was also noted that children's personality trait profiles were positively associated with their risk attitudes although the effects for boys differed from those of girls.

Keywords : risk attitudes, gender, power control theory, socialization.

I. INTRODUCTION

Individuals tend to be driven by two goals when addressing their personal financial situation (Wakita, Fitzsimmons, & Liao, 2000). First, individuals are motivated to maintain or improve their level of living. Second, individuals strive to maintain or increase their financial security. Increasing net worth and income through investing is an obvious method for meeting both goals (Finke & Huston, 2003). The pursuit of increased income, wealth, and overall financial well-being generally entails making financial decisions under risk or uncertainty (Chaulk, Johnson, & Bulcroft, 2003). Much of the academic literature shows that women tend to be less risk tolerant than men (Arano, Parker, & Terry, 2010; Byrnes, Miller, & Schafer, 1999; Jianakoplos & Bernasek, 1998; Kohler, 1996; Neelakantan, 2010; Olsen & Cox, 2001; Yao & Hanna, 2005). That is, men report greater enjoyment from taking risks and they describe preferences for engaging in behavior that is exciting. Such differences, as described by Neelakantan (2010), may help explain the divergence in wealth accumulation by women and men over the lifespan. Because women tend to shy away from risk taking they may position their portfolio choices in assets that provide low risk-adjusted returns, and as such,

accumulate less wealth over their lifetimes. This descriptive observation of behavioral outcomes is generally well known. What still remains to be answered is why women seem to generally exhibit risk attitudes that are less aggressive than men.

One reason for this gap in the literature is that the global study of personal risk taking has been driven primarily by questions directed at understanding individual differences in risk attitudes, as proxied by risk tolerance and its inverse, risk aversion. Specifically, nearly all studies that have been designed to investigate aspects of risk taking, including those that examine the determinants of risk attitudes, have been framed in a descriptive manner. That is, researchers have spent the past 20 or more years searching for and describing the demographic, socioeconomic, and psychosocial factors associated with a person's willingness to engage in behaviors that entail potential gains and losses (Grable, 2008). Research showing gender, socioeconomic, and age differences in risk attitudes, for example, have helped to establish baseline measures of risk tolerance that are widely used by practitioners and educators, as well as by those looking at issues from an academic perspective.

Interestingly though, very little empirical work exists to help explain individual differences in risk attitudes. Consider again gender differences in risk tolerance. Nearly every published study over the past quarter century that has dealt with an examination of how women and men conceptualize risks, both financial and otherwise, has shown women to be less risk tolerant than men. There have been generalized attempts to couch such differences in theory but with little success. In the end, the debate has come down to one of physiological versus socialization accounts of risk differences, with groups of researchers falling back on these preconceived notions to account for risk differences.

Those who champion a physiological explanation of gender differences in risk attitudes do so by concluding that socialization conceptualizations show few statistically significant patterns of being linked with the formation of risk attitudes. Consider a noteworthy study by Miller and Stark (2002). They were interested in explaining why women tend to be more religious than men. They framed religiosity as a form of

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risk aversion, and using gender-focused attitudinal measures of socialization, concluded that these factors were not associated with a person's propensity to take risk. Almost by default, Miller and Stark, and others as well (e.g., Cross, Copping, & Campbell, 2011; Nolen-Hoeksema & Hilt, 2006), concluded gender differences in risk tolerance are more closely associated with biological differences rather than be driven primarily by socialization forces.

Until recently, those who opposed the physiological explanation of gender differences in risk attitudes were challenged to document the role of environmental factors in shaping a person's willingness to take risks. There have been few theoretically based explanations of gender differences in risk tolerance based strictly on socialization theory, although gender orientation and gender role socialization have been proffered as explanations. Instead, researchers have most often documented gender differences, acknowledged that differences might be physiological, but then concluded that it is equally likely that socialization-type variables are apt to play just as an important role in shaping attitudes. These papers typically end with an encouragement for future authors to incorporate additional socialization measures in their studies to help support the socialization argument.

Those facing this explanatory problem are not constrained to just a few academic disciplines. Researchers in nearly every field of social science have noted a tendency among women to exhibit less risk tolerance (Arch, 1993; Arano, Parker, & Terry, 2010; Byrnes, Miller, & Schafer, 1999; Jianakoplos & Bernasek, 1998; Kohler, 1996; Neelakantan, 2010; Olsen & Cox, 2001; Yao & Hanna, 2005). In some fields, such as religiosity and society, there has been a move toward explaining such differences as purely physiological (Miller & Stark, 2002). Yet, in other disciplines, new theory has been developed that explains gender differences as a form of socialization. Hagan, Gillis, and Simpson (1985; 1990), working in the sociology field on juvenile delinquency issues, developed power-control theory (PCT) as a tool to move beyond purely descriptive observations of gender differences in adolescent delinquency to explaining disparities. Since that time PCT has been used in a wide variety of contexts. For example, Collett and Lizardo (2009) borrowed from PCT to show that the biological explanation for differences in religiosity, as noted by Miller and Stark, may not be as robust as previously thought. Their work showed that PCT might be applicable beyond providing a framework for purely sociological questions.

In this paper, we apply aspects of PCT as a theoretical foundation for explaining generalized risk-taking attitudes among women and men. Physiological manifestations of gender differences in risk attitudes are also tested. In the following section we outline the basic

concepts and tenets of PCT. This is followed by a review of the role psychosocial and physiological characteristics play in explaining risk attitudes.

II. THEORETICAL BACKGROUND

a) *Power Control Theory*

Traditional socialization and gender-role theory posits that women and men receive disparate cues from family, friends, and society in relation to how they should act in society. Gender training begins, within this theoretical conceptualization, at the earliest of ages and continues throughout the lifespan. Interestingly, the empirical evidence and broad generalizability of socialization and gender-role theory has been somewhat fragmented. PCT is a socialization theory but different in its focus. A key concept within PCT is that gender differences are shaped at the household level through family structure. Specifically, households can be categorized along a patriarchal/egalitarian spectrum. Originally, PCT was used to classify households based on comparing the relative power of husbands and wives within a household. Families in which a mother's role is primarily involved in managing the home or in situations where the mother's education and occupational status is lower than her husband were classified as unbalanced and patriarchal. Within this context, child socialization is assumed to be delegated to mothers, with girls being socialized to take few risks and to adopt conservative social norms (Leiber & Wacker, 1997).

Several concerns have been raised in the literature regarding the core assumptions of PCT. A primary issue involves households where only one parent—usually a mother—is concerned with the day-to-day activities of the household. By definition, single mother households are considered to be “balanced” and more egalitarian in nature, resulting in relaxed gender-role socialization for children raised in these households. The empirical evidence supporting this assumption has been mixed. As a result, recent tests of the theory have tended to focus more broadly on the role of the mother in shaping the attitudes and behaviors of her children through her power in the household, regardless of marital status, rather than simply on the relationship of power between a husband and wife (Leiber & Wacker, 1997).

In terms of the patriarchal/egalitarian continuum, power and control can be proxied by a mother's socioeconomic status (SES). Mothers who exhibit higher occupational prestige and high attained education can be classified as being more egalitarian or balanced. On the other hand, mothers with low occupational prestige and low education levels represent what is defined as being patriarchal or unbalanced in PCT. In the context of this study, daughters raised in households that are more patriarchal in focus are predicted to be less risk tolerant (more risk averse). This stems from the tendency of

mothers in patriarchal (i.e., unbalanced) households to dominate their children (particularly girls). Such domination on the part of mothers may be associated with the mother's belief that she must exert control over her children's actions to fit a model of traditional gender norms. If PCT works in explaining the origins of risk attitudes, there should be risk-tolerance differences associated with a mother's SES. Children from households that are more egalitarian (i.e., the mother has high educational achievement and occupational prestige) should be more risk tolerant than children raised in patriarchal (unbalanced) households.

Proponents of PCT, as an explanatory theory of risk attitude development, do not dismiss the possibility that risk attitudes are potentially trait related. Rather, PCT supporters argue that the family dynamic, as an environmental force, probably plays a much more important role in shaping risk attitudes. This is particularly true for girls, although the theory is not precisely clear why the effect is greater for girls. Collett and Lizardo (2009, p. 216) summarized the theory this way: "The core of the theory is an assumption about the link between socially structured power relations outside of the household and variations in the social control of sons and daughters within the household." Girls raised in a patriarchal home are predicted in PCT to act more passively and take on risk avoidance preferences. Boys, on the other hand, are predicted to exhibit risk-taking attitudes. The outcome for girls stems from two phenomenon. First, parents in patriarchal households tend to encourage risk taking among their sons, while sheltering their daughters from real and assumed risks. Second, mothers in homes where there are socioeconomic power imbalances tend to exert control over their daughters, passing along gender norms that suggest risk aversion is a positive character attribute.

As suggested above, recent restatements of PCT have focused almost entirely on the mother's role as the primary agent of socialization. It has long been known that a mother's SES plays a key role in shaping family behavior (Green, 1970). Recent research suggests that the agency effect of the mother is greatest for girls. McCarthy, Hagan, and Woodward (1999) noted that girls raised in homes where the mother's SES was dominant were more willing to take risks, and that the level of risk attitudes for girls raised this way came close to matching that of boys brought up in the same type of household. McCarthy and his associates suggested that mothers with high SES may act to actually lower their sons' preference for risk. Based on key concepts of PCT, we anticipated test results to match the following hypotheses:

H₁: Children of high socioeconomic mothers will exhibit risk attitudes that are greater than other children;

H₂: Mothers' SES will have a more pronounced effect on the risk attitudes of girls than boys; and

H₃: Mothers' SES, compared to the physiological traits of children, will be more directly related to the risk attitudes of children.

b) *Predisposing Personal Factors and Risk Attitudes*

Even among the most ardent supporters of PCT, as well as socialization theorists, there is tacit acknowledgment that risk attitudes may be shaped by factors associated with an individual (Collett & Lizardo, 2009). In 1993, for example, Irwin presented a model of risk-taking attitudes and behaviors. Irwin concluded that there are a number of predisposing factors that influence risk-taking attitudes among adolescents. A later research study conducted by Grable & Joo (2004) adapted and simplified Irwin's risk-taking behavior model by testing only predisposing factors as determinants of risk-tolerance attitude. They noted that

III. METHODOLOGY

a) *Data*

Pooled data from the National Longitudinal Survey of Youth 1979 cohort (NLSY) and the NLSY Child Survey were used to test the conceptual framework and associated hypotheses. Sponsored by the U.S. Department of Labor, the NLSY is a multi-purpose panel survey that originally included a nationally representative sample of 12,686 men and women who were all 14 to 21 years of age on December 31, 1978. The survey originally included substantial oversamples of African-American, Hispanic, economically disadvantaged white, and military youth, although in later surveys the latter two oversamples have been largely deleted from the main sample. The remaining sample, however, retains its national representation.

From 1978 through 1993 participants were interviewed annually. Beginning in 1994 a biennial interview mode has been used. Starting in 1986, the children of NLSY female respondents were interviewed and assessed every two years. Since 1988, children age 10 and over have completed personal interviews about a wide range of their schooling, family, peer-related and other attitudes and behaviors. As of the 2008 interview round, the NLSY women had attained the ages of 43 to 51. The children of these female respondents are estimated to represent over 90 percent of all the children ever to be born to this cohort of women. Starting in 1994, children who had reached the age of 15 by the end of the survey year were no longer assessed. Instead these respondents completed personal interviews akin to those given to their mothers during late adolescence and into adulthood. A total of 11,466 children have been identified as having been born to the original 6,283 NLSY female respondents. In this analysis, data from 3,088 males and 3,139 females was used. Missing data were replaced in the analysis using estimated means and intercepts.

b) Outcome Variable

A child's risk attitude was hypothesized to be comprised of the following three items: (a) enjoys taking risks, (b) enjoys new and exciting experiences even if they are frightening, and (c) feels life without danger is dull. Each item was scored as follows: 1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree. An exploratory factor analysis was conducted to test the underlying validity of the measure. A principal components factor analysis, using varimax rotation, showed that the three items explained the one factor latent variable. The KMO sampling adequacy was estimated to be .66, while Bartlett's sphericity was significant at the $p < .001$ level. Scores from each item were summed into a risk-attitude scale. Scores on the measure ranged from 3 to 12, with higher scores representing elevated risk tolerance (low risk aversion). The mean and standard deviation for the variable was 7.06 and 1.59, respectively. The final risk attitude measure was then used as the outcome variable in an OLS regression.

c) Parent's SES

As postulated in PCT, a mother's SES was predicted to influence the risk attitudes of her children.

Traditionally, SES has been measured using one or a combination of the following: (a) income, (b) education, and (c) occupational prestige. Because of the highly interrelated nature of these characteristics, many researchers choose one variable as a proxy for SES. Income and education are typical choices for measuring SES. The downside to using one of these two measures is, either individually or jointly, the loss of the social status provided through a person's occupation. In order to account for occupational prestige, a slightly different, but more established, measurement procedure was employed in this study. A two-factor measure of social status, based on Barratt's (2011) Simplified Measure of Social Status (BSMSS), was calculated for each mother. This measure of SES was, itself, based on the work of Hollingshead (1975).

The education level for each mother as of 2008 was recoded. Within the NLSY education is measured in years, ranging from 1 to 20. Education was recoded into one of seven categories, with each category receiving an index score. Higher scores correspond to increased attained education. The categories and scoring for education are shown in Table 1.

Table 1 : Recoded Education with Status Scores.

<i>Level of School Completed</i>	<i>Score</i>
Less than 7 th grade	3
Junior high / Middle school (9 th grade)	6
Partial high school (10 th or 11 th grade)	9
High school graduate	12
Partial college (at least one year)	15
College education	18
Graduate degree	21

Beginning in 2004, all occupations and industries in the NLSY were coded with the Census 4-digit, NAICS-based codes. The industry and occupational codes are quite extensive. Basically, each job typically performed in the United States has a code associated with the activity. Codes range from 10 to 9990; however, the coding is not intuitive or ranked in terms of status. Because of this, since the 1940s, sociologists have provided guidelines for converting Census Bureau occupational codes into ordinal prestige scores. The approach employed here follows standard coding procedures. Table 2 shows how each occupational code was recoded to match the occupational prestige rankings used by Barratt (2011).

The final SES measure for mothers that was incorporated into the analyses was created by adding together each mother's educational and occupational prestige score. Scores ranged from 8 to 66, with a mean and standard deviation of 40.35 and 15.98, respectively. Mothers with the highest SES were denoted with high scores on the summated variable.

A similar SES measure was created for fathers. The range of SES scores was 7 to 66. The mean father SES was 33.11 (SD = 16.91). It is important to note, however, that data were incomplete for many cases. This was the result of asking children to indicate the level of education held by their fathers.

Table 2 : Barratt Occupational Prestige Scores

<i>Occupation</i>	<i>Score</i>
Day laborer, janitor, house cleaner, farm worker, food counter sales, food preparation worker, busboy.	5
Garbage collector, short-order cook, cab driver, shoe sales, assembly line workers, masons, baggage porter.	10
Painter, skilled construction trade, sales clerk, truck driver, cook, sales counter or general office clerk.	15
Automobile mechanic, typist, locksmith, farmer, carpenter, receptionist, construction laborer, hairdresser.	20
Machinist, musician, bookkeeper, secretary, insurance sales, cabinet maker, personnel specialist, welder.	25
Supervisor, librarian, aircraft mechanic, artist and artisan, electrician, administrator, military enlisted personnel, buyer.	30
Nurse, skilled technician, medical technician, counselor, manager, police and fire personnel, financial manager, physical, occupational, speech therapist.	35
Mechanical, nuclear, and electrical engineer, educational administrator, veterinarian, military officer, elementary, high school and special education teacher.	40
Physician, attorney, professor, chemical and aerospace engineer, judge, CEO, senior manager, public official, psychologist, pharmacist, accountant.	45

d) Mother's Risk Tolerance Profile

Risk tolerance was assessed in the 2006 NLSY using a version of the Health and Retirement Survey (HRS) risk aversion index (Barsky, Juster, Kimball, & Shapiro, 1997). Original NLSY respondents (i.e., mothers) were asked to answer the following three risk appraisal questions :

1. *Suppose that you are the only income earner in the family, and you have a good job guaranteed to give you your current (family) income every year for life. You are given the opportunity to take a new and equally good job, with a 50-50 chance it will double your (family) income and a 50-50 chance that it will cut your (family) income by a third. Would you take the new job?*

Respondents who answered yes were then asked to answer question 2. Those who responded negatively were then asked question 3.

2. *Suppose the chances were 50-50 that it would double your (family) income, and 50-50 that it would cut it in half. Would you still take the new job?*

Those who answered no to question 2 were asked the following question :

3. *Suppose the chances were 50-50 that it would double your (family) income and 50-50 that it would cut it by 20 percent. Would you then take the new job?*

Risk scores were calculated by classifying those who answered no to questions 1 and 3 as having very

low risk tolerance (or high risk aversion). Respondents who answered no to questions 1 and yes to 3 were classified as having low risk tolerance. Those who answered yes to questions 1 and no to 2 were categorized as exhibiting moderate risk tolerance. Finally, respondents who answered yes to questions 1 and yes to 2 were considered to have high risk tolerance. Given the ordinal nature of the variable, four dichotomously coded risk measures were created, so that respondents were categorized as (a) very low risk tolerant, (b) low risk tolerant, (c) moderate risk tolerant, or (d) high risk tolerant. The first three categories were used in the regression analysis, with high risk tolerant as the omitted category.

e) Individual Child Characteristics

As discussed in the review of literature, there are a number of predisposing factors that are known to influence risk choices and attitudes. Several of these variables for the children respondents were included as covariates in the analysis. Sex was coded as males 1 and females 2. The sample was nearly evenly split between males and females. Income was measured by asking how much each respondent received from wages, salaries, commissions, or tips from all job before deductions for taxes or anything else. The mean response was \$14,265 (*SD* = \$17,899). Race was measured in the NLSY by classifying respondents as Hispanic, Black, or Non-Black, Non-Hispanic. The Hispanic and Black variables were included in the analysis with Non-Black, Non-Hispanic being the omitted category. Approximately 22% of respondents

indicated being Hispanic. Thirty-five percent reported being Black. Forty-three percent reported being Non-Black, Non-Hispanic. The marital status of respondents was coded as 1 if married, otherwise 0. Approximately 14% of child respondents indicated being married. This low percentage is not surprising. The average age of the children was 23.16 years ($SD = 4.86$ years). [Note: age was excluded from the analysis because of its high

correlation ($r = .86$) with education.] Education was measured by asking the highest grade completed by a respondent. Answers could range from none to eighth year in college. On average, respondents indicated completing 12th grade. Household size was assessed by asking the number of people living in a respondent's household. The mean response was 3.48 persons ($SD = 1.57$).

IV. RESULTS

Table 3 : Correlation Coefficient Estimates Among the Independent Variables.

	Child Sex	Child Race (Black)	Child Race (Hispanic)	Child Education	Child Household Size	Child Income	Child Marital Status (1 = Married)	Mother's Very Low Risk Tolerance	Mother's Low Risk Tolerance	Mother's Moderate Risk Tolerance	Mother's SES	Father's SES
Child Sex	1.00											
Child Race (Black)	.07	1.00										
Child Race (Hispanic)	.02	-.33 ^c	1.00									
Child Education	.09	.04	-.04	1.00								
Child Household Size	.02	-.04	.11 ^a	-.15	1.00							
Child Income	-.03	-.08	-.03	.48 ^c	-.09	1.00						
Child Marital Status (1 = Married)	.07	-.04	-.03	.06	.03	.23 ^c	1.00					
Mother's Very Low Risk Tolerance	.00	.01	-.04	.05	.02	.03	-.07	1.00				
Mother's Low Risk Tolerance	.03	-.18 ^b	.09	-.02	-.03	.00	-.02	-.42 ^c	1.00			
Mother's Moderate Risk Tolerance	.05	.02	-.02	-.10	.05	-.03	.15 ^b	-.49 ^c	-.14 ^b	1.00		
Mother's SES	.07	-.05	-.16 ^b	.15 ^b	-.12 ^a	.08	.08	.19 ^b	-.03	-.16 ^b	1.00	
Father's SES	-.07	-.01	-.10	.08	-.06	-.04	-.04	-.01	-.03	-.01	.37 ^c	1.00

Notes : ^a = $p < .05$; ^b = $p < .01$; ^c = $p < .001$

The first hypothesis stated : Children of high socioeconomic mothers will exhibit risk attitudes that are greater than other children. Support for the hypothesis was noted. Table 5 reports the regression weight for the

association as being significant at the $p < .05$ level. The standardized direct effect of the association is reported in Table 6 (.06). The relationship, as hypothesized was positive.

Table 4 . Regression Predicting Child's Risk Scores with Mother and Father SES Compared.

Variable	Mother SES			Father SES		
	b	Std. Error	β	b	Std. Error	β
Child Sex	-0.56	0.05	-0.18***	-0.31	0.19	-0.10
Child Race (Black)	-0.72	0.06	-0.22***	-0.43	0.21	-0.13*
Child Race (Hispanic)	-0.12	0.07	-0.03	0.22	0.25	0.05
Child Education	-0.07	0.01	-0.11***	-0.08	0.06	-0.02
Child Household Size	-0.04	0.02	-0.04*	-0.02	0.06	-0.02
Child Income	-	0.00	-.01	-	0.00	-0.01
	3.787E-7			4.089E-6		
Child Marital Status (1 = Married)	-0.38	0.08	-0.09***	-0.65	1.65	-0.02
Mother's Very Low Risk Tolerance	-0.10	0.07	-0.03	-0.11	0.26	-0.04
Mother's Low Risk Tolerance	-0.07	0.10	-0.01	-0.31	0.36	-0.06
Mother's Moderate Risk Tolerance	-0.17	0.09	-0.04	-0.52	0.33	-0.11
Mother's SES	0.01	0.01	0.06**	0.01	0.01	0.04
Constant	9.19	0.20		8.81	0.79	
	$F_{11,3694} = 88.65, p < .001;$			$F_{11,305} = 3.95, p = .10;$		
	$R^2 = .10$			$R^2 = .02$		

Notes: * $p < .05$ ** $p < .01$ *** $p < .001$.

Hypothesis 3, which stated that mothers' SES, compared to the physiological traits of children, will be more directly related to the risk attitudes of children, was not accepted. The effect of a child's personality on risk attitudes was nearly six times the effect of mother's SES (.38 from the 2nd column in Table 6).

Table 5 : Regression Predicting Child's Risk Scores with Mother SES and Boys and Girls Compared.

Variable	Boys			Girls		
	b	Std. Error	β	b	Std. Error	β
Child Race (Black)	-0.84	0.08	-0.25***	-0.60	0.08	-0.19***
Child Race (Hispanic)	-0.19	0.09	-0.05*	-0.05	0.09	-0.01
Child Education	-0.05	0.02	-0.07**	-0.09	0.02	-0.14***
Child Household Size	-0.04	0.03	-0.04	-0.05	0.03	-0.05*
Child Income	4.999E-7	0.00	0.01	-3.175E-6	0.00	-0.03
Child Marital Status (1 = Married)	-0.38	0.12	-0.08*	-0.38	0.10	-0.09***
Mother's Very Low Risk Tolerance	-0.11	0.10	-0.03	-0.09	0.10	-0.03
Mother's Low Risk Tolerance	-0.07	0.14	-0.01	-0.08	0.13	-0.02
Mother's Moderate Risk Tolerance	-0.15	0.13	-0.03	-0.18	0.12	-0.04
Mother's SES	0.01	0.01	0.07**	0.01	0.01	0.05
Constant	8.35	0.28		8.32	0.26	
	$F_{10,1841} = 31.76, p < .001;$			$F_{10,1852} = 31.30, p < .001;$		
	$R^2 = .06$			$R^2 = .07$		

Notes : * $p < .05$ ** $p < .01$ *** $p < .001$.

In order to address Hypotheses 2, 5, and 7, the conceptual framework was tested using (a) data from daughters only and (b) data from sons only. Figure 3 shows the results from the daughter's only test, whereas Figure 4 shows the son's only specified model.

V. DISCUSSION

Gaining a better understanding of attitudinal differences—particularly in the domain of risk taking—between women and men is critical for several reasons, particularly within the context of household financial decision making. First, portfolio decisions play an important role in helping individuals improve their level

of living while also increasing financial security. Yao and Hanna (2005) argued that individuals and households that exhibit risk-aversion attitudes may have difficulty in meeting their financial goals. This might help explain why women, in general, accumulate less wealth over their lifespan than men (Jianakoplos & Bernasek, 1998). Second, providing insights into why women and men differ in relation to risk-taking attitudes can add to the ongoing discussion related to the physiological versus socialization debate or what is known as the question of nature versus nurture (Bajtelsmit & Bernasek, 1996; Gilliam, Goetz, & Hampton, 2008). Third, understanding how people perceive risks can be used to shape policy

decisions (Brehmer, 1994) with respect to the way women and men are encouraged to earn, save, and spend for daily financial wants and needs. Finally, studies designed to evaluate gender differences in risk-taking attitudes provides a mechanism to test and develop theory that can be used to explain such differences.

In terms of this paper's primary purpose, this study provides only partial support for PCT as a tool for explaining gender differences in risk-taking attitudes. Mother's SES had a positive association with risk attitudes when daughters and sons were included in the same model. However, counter to PCT, when daughters were tested separately, mother's SES was not significantly associated with risk attitude. Nor was a mother's psychosocial profile. On the other hand, and again contrary to PCT, mother's SES and psychosocial profile was significantly associated with the risk attitudes of sons.

The conclusions from this study add to the existing body of literature in a number of ways. First, results suggest that the shaping of risk attitudes is likely not an either-or choice between physiology and socialization. Instead, the role of physiology may be greater for women than it is for men. On the other hand, the role of a son's mother in shaping risk attitudes through socialization processes appears quite strong. Is it possible that what drives the risk attitude of women is different than that of men? The results from this study suggest that this is the case.

In summary, this study demonstrates the affect mothers have in shaping the risk attitudes of their children. Daughters tend to develop risk attitudes independently but sons may be strongly influenced through the socialization process of their mothers. The children may be largely unaware of their own predispositions. Financial service professionals are encouraged to review a client's family history to better understand their client's risk attitudes. Policy makers also need to consider family composition and particularly mothers' status in formulating policy intending to influence saving behaviors. Finally, as the results from this study suggest, researchers have yet another variable to consider when examining risk tolerance issues.

a) *Limitations and Future Directions*

While the findings from this research are noteworthy, it is important to take note of limitations associated with this study. For instance, although the data were nationally representative of the U.S. population, there is a potential problem associated with missing data. In order to run a variance-covariance matrix within a structural equation model, it was necessary to estimate some missing variable means and intercepts. Further replications of the research, using different datasets and structural equation approaches, may result in results that differ from those

reported here. Additionally, given the way data were collected from children, information about a father's education, occupation, and psychosocial profile were limited. It is recommended that future studies consider testing the role of a father's SES on a child's risk attitude. The inclusion of father data will provide a more complete picture of PCT as a tool to help explain gender differences in risk taking. Finally, additional research is needed to gain a more full understanding of the factors associated with gender differences in risk attitudes. The development of a theoretical framework to explain such gender differences is very much needed. This paper helps establish baseline documentation that can be used by others in the development of new explanatory models and theories.

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Legal Aspects of Accession of EU to ECHR

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Abstract - The European Union (EU) became the guardian of the rights of Europeans. From a treaty-based entity the European Union became a supranational system based on democracy and where the treaties and the EU human rights principle operates as constitutional law. Moreover, the law of the European Union it is without doubt a form of European Public Law based on a system of administrative and increasingly constitutional law including its own Charter of Human Rights.

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Legal Aspects of Accession of EU to ECHR

Neliana Rodean

Abstract - The European Union (EU) became the guardian of the rights of Europeans. From a treaty-based entity the European Union became a supranational system based on democracy and where the treaties and the EU human rights principle operates as constitutional law. Moreover, the law of the European Union it is without doubt a form of European Public Law based on a system of administrative and increasingly constitutional law including its own Charter of Human Rights.

Into the European constitutional framework, from the second half of the last century, the political and judicial institutions of Europe have committed in creating a European constitutional order in which prevails the protection of human rights. The fundamental values belong to the European constitutional heritage, to Europe without borders and without double standards of protection. The rights declared in the constitutions must find concrete tools to render them effective. To ensure the effectiveness of the protection of human rights on our continent, the European Union's adherence to the European Convention of Human Rights (ECHR) is considered to be the ideal tool in the absence of a legal and formal link between the systems of Strasbourg and Luxembourg.

With the Treaty of Lisbon, the expected adherence of the EU to the ECHR was, in fact, hailed as "a courageous political, cultural and legal decision."

Keywords : *European union, European public law, human rights, EU's accession to ECHR.*

I. BRIEF REMARKS ON THE NICE CHARTER

a) *Political tool or binding act?*

Precondition for the establishment of a European State the fundamental rights have experienced a slow and peculiar statement in European legal order. The Treaties of Paris (ECSC Treaty - Paris 18 April 1951) and Rome (EEC Treaty and the Euratom Treaty - Rome March 25, 1957) establishing the European Communities, originally contained no catalog of fundamental rights to safeguard against potential abuse by Community institutions and was not even mentioned the need to ensure the protection of those rights. There are only some exceptions regarding the individual freedoms (of movement - Article 39 EC Treaty; of establishment - Article 43 EC Treaty; of providing

services - Article 49 EC Treaty) necessary to realization of the common market. Therefore, the Community law arose as a «supranational order, without general purposes and, even more, without the task of protecting the fundamental rights related to the recognition of a *status civitatis*»¹.

During the years, the protection of the human rights promoted by the Court of Justice has had a positive echo in the European institutional scene, encouraging the progressive codification. The European theory of the human rights, prepared by the Community Court seems to have contributed to the formation of a true European constitutional law. On the one hand, the creation of the European constitutional space was made by the courts, by other, its gradual consolidation occurs through multiple attempts of codification of jurisprudential *acquis* into a *European Bill of Rights*.

The first textual reference to fundamental rights is found in the "Spinelli Project", i.e. the draft of the Treaty on European Union approved by the European Parliament on February, 14, 1984 but failed. Only in 1987 the Single European Act, inspired by the new orientation of the propositional case law on the subject, as well as the above-mentioned project, enrolled for the first time the fundamental rights in its Preamble: «Member States determined to work together to promote democracy on the basis of the fundamental rights recognized in the constitutions and laws of the Member States, in the Convention for the Protection of Human Rights and Fundamental Freedoms and the European Social Charter, notably freedom, equality and social justice»². To these statements, with no legal effect, did not follow any codification of the human rights.

The first textual basis binding to the Court of Justice in the field of fundamental rights has had with the Treaty of Maastricht³ signed on 7 February 1992: the Article F of the Treaty (now Article 6.1) states that «the Union shall respect fundamental rights, as guaranteed by the European Convention for the Protection of Human Rights and Fundamental Freedoms, signed in Rome on 4 November 1950 and as they result from the constitutional traditions common to the Member States, as general principles of Community law». Through the Article F the fundamental rights formally became sources of Community law, as higher-level general principles with respect to any act of the Community. In addition, unlike the previous case law,

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the provisions of the Article F seems to open the possibility of a joint relationship between the two sources of "production" of the human rights, the ECHR and the common constitutional traditions, contradicting the hypothesis, advanced by the doctrine, of a kind of hierarchy in favor of ECHR.

Moreover, the new dimension for the Protection of Fundamental Rights, formally inaugurated by the Treaty of Maastricht, has found a further strength in the European citizenship provided for by Article 8 of the Treaty, passing from "Europe of markets" to "Europe of citizens", giving to the European citizens a new legal status, in addition to their national citizenship. As is known, the moment of writing of fundamental rights in a special act will take place only with the Nice Charter proclaimed for the first time in December 2000.

The need to introduce in the framework of European legal order a catalog of fundamental rights has been the basis of intense debate in the history of the European Union, whose axis is biased by two conflicting positions: the first, favorable to the hypothesis of accession by the Community and the Union to the European Convention on Human Rights and Fundamental Freedoms guaranteed by the Strasbourg Court, the second, inclined to the development of a Charter of Fundamental Rights of European Union. The first hypothesis, long supported by the Commission, has been 'frozen' in the early 1990s, following the well-known Opinion 2/94⁴ made by the Court of Justice in April 1994 on the incompatibility of accession of the European Community to the ECHR with the Treaty establishing the European Community (TEC). So, the decision to proceed with the drafting of a Charter of Fundamental Rights has been at the European Council in Cologne on 3-4 June 1999, when the Europe heads of state and government deliberated to strengthen the protection of fundamental rights in the European Union in an appropriate Charter and to delegate the task of drafting of this project to a "Convention".

From a formal point of view, the Charter of Nice appear to fall into the ranks of acts which have no legal effect required. In fact, it looks like a joint Declaration or as an inter-institutional agreement between the European Parliament, Commission and Council, proclaimed in Nice on 7 December 2000. The conclusions of the Nice European Council states that "in accordance with the conclusions of Cologne, the question of the scope of the Charter will be examined at a later time." In addition, the Declaration n. 23 on the future of Union, annexed to the Final Act of the Treaty of Nice, refers to the Conference on the revision of the Treaties planned for 2002 the definition of the status quo of the Charter of Fundamental Rights. Finally, to support the arguments of the non-binding nature of the Charter

contributes its publication in the C series of the Official Journal dedicated to non-binding acts.⁵

The Charter has also been defined as an act of "constitutional substance", an expression of a constituent power capable of producing legal rules. That view has been strongly criticized on the base of the fact that the European Union, and therefore the power of its institutions, derive from the founding Treaties in accordance with the principle of conferred powers which establish that "the Community shall act within the limits of the powers conferred and of the objectives assigned to it by this Treaty"⁶.

The Charter is not a legal *strictu sensu* source, it seems to have a political value susceptible to "provoke important legal consequences" both to the internal Member State order both to the European order.

As regards to the Member States, the Charter has a dual emphasis: on the one hand, as parameter of judgment in case of a serious and persistent breach of one or more principles stated in Article 6.1; on the other hand, as a contribution to the national courts to identify the category of fundamental rights protected in the European system⁷.

With regard to the European Union, the Charter can operate, first, as an assessment parameter for the purpose of admission of new members which, as required by the Article 49 TEU, have to respect the principles stated in Article 6 paragraph 1 of TUE, including the fundamental rights and freedoms. The Charter is a certain point of reference for the States recently democratized to compare the compliance of their systems to the European standards of protection of the human rights. Furthermore, the Charter can be a sort of "compass" that can guide the choices of the European institutions, on which rests a duty of coherency with the rights contained in the Charter.

The references to the Charter are also important instruments adopted under the third pillar (Title I TUE) relating to matters in which the human rights has a considerable importance: it is enough to evoke the Decisions of 13 June 2002 no. 2002/475/JHA⁸ on combating terrorism and no. 2002/584/JHA⁹ on the arrest warrant and the surrender procedures between Member States, the decision on the establishment of Eurojust taken by the Council, under Article 34 par. 2 TEU on a proposal from the Federal Republic of Germany, Portugal, France, Sweden and Belgium.

Also in the framework of European legal order, also the Community judge gave a contribution to the enhancement of the Nice Charter despite of its no binding legal, as noted by the doctrine, the case law has shown that «the Charter is included in the "movement" of the law as a tool of explanation, identification and specification of a set of rights, already part of the *acquis communautaire*»¹⁰.

The Charter is a form of codification of fundamental rights, a atypical source or an act which, though devoid of normative value in the strict sense, being "jurisdictionable" is not without legal force but acts as support of custom source and jurisprudence.

Despite the contribution of the Charter at the consolidation of a *European common Jus*, should not be forgotten that determined a number of vulnerable issues as its relationship with the European Convention of Human Rights (ECHR).

b) *Nice Charter and the ECHR*

Following the proclamation of the Charter of Nice, there has been a progressive polarization of the "galaxy of European rights" around two very different systems, the ECHR system and the system of European Union. The problem of coordination between the Charter and the Convention is generated by the fact that the two documents contain a different mechanism for limiting the human rights, one, based on the principle of the general clause, the other, on restrictive clauses ad hoc.

The Charter, to Article 52 first paragraph contains a restrictive clause "that allows restrictions to fundamental rights and freedoms recognized on condition (*inter alia*) that effectively respond to objectives of general interest". The general restrictive clause of the first paragraph of Article 52 of the Charter of Nice is extended to rights guaranteed also by the Community Treaties, according to Article 52 second paragraph, and by the European Convention on Human Rights and Fundamental Freedoms (ex Article 52 the third paragraph). The Article 52 second paragraph seems to establish a hierarchical relationship between the limits laid down in the Treaties and the general restrictive clause provided in the Charter: rights which are based on treaties escape and are subject only to the conditions and limits laid down by the Treaties themselves.

As regards to the relationship between the Charter and the Convention, the third paragraph of Article 52 generates a dual problematic issue: first, to coordinate the relationship between general restrictive clause and those contained in the ad hoc European Convention on Human Rights: the Charter seems to solve this problem for the benefit of the ECHR, which is configured by the authors of the Charter as a minimum standard of protection. The third paragraph of Article 52 also raises another complex issue which represents the central problem of the relationship between the two systems of guarantee of rights, namely the relationship between the Strasbourg Court and the Court of Luxembourg.

What happens in case of differences in interpretation between the two courts? The framers of the Charter have attempted to introduce measures to prevent any conflicts of jurisprudence. First, in the

Preamble of the Charter an explicit reference refers to the rights recognized by the Court of Justice of the European Communities and the European Court on Human Rights, without, envisage a special solution in case of jurisprudential conflict. In addition, the second paragraph of Article 53 of the Charter requires recourse to an interpretation of the fundamental rights protected by the Charter which does not affect the significance of the rights guaranteed by national constitutions of member states and other international instruments, in particular the European Convention on Human Rights: «nothing in this Charter shall be interpreted as restricting or adversely affecting human rights and fundamental freedoms as recognized, in their respective fields of application [...] by international agreements such as the Union, the Community or all the Member States are party, including the European Convention for the Protection of Human rights and Fundamental Freedoms, and by the constitutions of the Member States.» In terms of the Article 53 the way to choose in case of conflict has an interpretative nature. This solution was considered by the Council of Europe as a compromise of temporary character in view of a more radical response to the problem of divergences in judicial decisions between the two courts, established by the accession of European Union to the Convention of Rome.

It is clear that the glowing core of relations between the European system of protection of fundamental rights and the ECHR system involves issues related to interaction between the Luxembourg Court and the Strasbourg Court - two judges who, though very different from each other, found a common battlefield in area of human rights, capable of triggering a "war between the two Courts"¹³.

II. COEXISTENCE OF THE TWO EUROPEAN COURTS AND THEIR COOPERATION

a) *Cross-references between Luxembourg and Strasbourg Courts*

The debate on the relationship between the Strasbourg Court and the Court of Luxembourg appears to be the crucial key in the protection of human rights in Europe because of the essentially "evolutive" dimension of the reciprocal influences between the Courts of Strasbourg and Luxembourg, especially in the analysis of misunderstandings that have characterized, on the one hand, the recognition by the Luxembourg Court of the *status* of the ECHR into European legal order and, by other, the recognition by the Commission and the European Court of *status* of the European Community into the conventional legal system. From the convergence of Courts is passed to the gradual integration of the respective legal systems, which has

contributed to the construction of what has been called the "European Constitutional Law".

The protection of fundamental rights within the EU has established not only as a goal but rather as a tool controlled by a dual cause: on the one hand, it has been introduced to confirm the integration and thus facilitate and ensure the future development, from the other, it has been a fortification of effectiveness and primacy of EU law against the claims of national constitutional courts, fearful of the breach by Union measures of fundamental rights provided in their laws.¹⁴

The relationship between the EU system and the conventional system of protection would seem to constitute a relationship of *species a genus*: the first mechanism based on a self-contained and confined to the exclusive competence of the Community, and the second focused on a wider and subsidiary mechanism of protection measures laid down by Member States. Therefore, two parallel systems, no communicative, no legal ties, whose the only *trait d'union* was the same legal source of rights, namely the ECHR.

The independent case-law of the Luxembourg Court found its justification in the peculiarities of the system of protection of the human rights in the EU and in the absence of a formal legal relationship between the two legal systems: the protection of human rights must be guaranteed in the context of the structure and objectives of the Union; in addition, in the absence of a common catalog of fundamental rights, the Court has used heteronomous tools (i.e. "the constitutional traditions common to the Member States and the international treaties for the protection of the human rights, which the Member States have signed or had cooperated) to identify specifically the object of its protection, within which the ECHR has taken a particular significance.

The first sign of deference by the Judge of the fundamental rights vis-à-vis the Community Judge seems to rise in the case *Marckx v. Belgium* in 1979¹⁵, in which the Strasbourg Court has joined *sic et simpliciter* the doctrine of prospective overruling as well as interpreted and applied by the Luxembourg Court in *Defrenne* case¹⁷.

Emblematic of a "peaceful coexistence" of the two supranational Judges, the attempts of more explicit convergence of the European Court on the positions of the Community Court will have only the end of the nineties and are manifested in two forms: in some cases the Court has made cross-references to case law of his counterpart *ad adiuvandum*, in others, it has changed its orientation preferring to Luxembourg. Of greater importance for the purposes of the present work seems to be the second attitude of the Strasbourg Court, which in at least two cases has made a cross-reference to the Court of Justice for correct, partially, its case-law.¹⁸

For at least twenty years (1970-1990), because of the great differences that exist between the new

Community system of protection of fundamental rights and the existing conventional system, the relationship between the Luxembourg Court and the Strasbourg Court were far from cordial. In particular, in the absence of a formal link between the two mechanisms of guarantee, the effectiveness of the system of protection of the human rights in Europe has been undermined by differing interpretations. In the case *Dorca Marina*¹⁹, the Court of Justice has given a restrictive reading of these rights, limited the efficiency solely to proceedings before courts or tribunals and excluding, therefore, the applicability to the case submitted to it for a preliminary decision regarding an administrative penalty imposed by the Community Commission, a non-judicial body. The position taken by the Court of Justice was in accordance not only with the conventional provisions, but also with previous decisions of the European Court. Also in cases *Orkem v. Commission*²⁰ raised before the Court of Justice, and *Funke v. France*²¹, decided by the European Court, it complained about the breach of the right against self-incrimination, accessory guarantee included among those arising from Article 6 of the ECHR regarding due process. The Luxembourg Court has ruled that the right not to incriminate oneself could be inferred from the provisions of Article 6 and the case law of the Strasbourg Court.

At the end of the eighties, another contrast between the jurisprudence of Luxembourg Court and Strasbourg Court took place with reference to Article 8 of the European Convention concerning the right to respect for private and family life²². But three years after this sentence, the Strasbourg Court has denied this approach, stating in the case *Niemietz v. Germany*²³, that "the scope of the concepts of privacy and residence referred to in that provision also covers certain conventional local or professional and commercial activities".

b) *Through a homogeneous system in the case law of the two courts*

Formulated for the first time by the Parliamentary Assembly in 1981²⁴, the proposed accession was re-launched by the European Parliament at beginning of the nineties in three resolutions adopted at December, 15, 1993²⁵, January, 18 1994²⁶ and April, 26, 1995²⁷. Further, in particular the Parliament insisted that the absence of a formal legal connection between the two systems of protection caused gaps in the Community framework, because of the removal of the organs of the European Community to the mechanism of conventional control, and amplified the risk of interpretive divergences.

On 19 April 1994 the Council of the European Union has asked the Court of Justice for an opinion on the compatibility of the proposed accession to the EC Treaty²⁸. Specifically, the Court was asked to answer three questions: whether the request for an opinion in

the absence of a negotiating text of accession agreement was admissible, if the Community had the competence to conclude such an agreement, if the contents of this kind of agreement was compatible with the EC Treaty. On the first question, the Court ruled positively accepting the admissibility of the case on the basis of two main arguments: the preventive function of Article 228 TEC as a deterrent to the occurrence of difficulties during the negotiation of a treaty and the widespread knowledge of the text the Convention to which the Union should join. Upheld the admissibility, the Court focused its opinion on the question of jurisdiction, intentionally omitting to assess the compatibility of accession agreement with the EU Treaty. The Court has developed its own decision-making process by examining the principle of conferral, as codified in the Maastricht Treaty, but admitting that the conferral for the conclusion of international agreements could be implied. To this aim, it has examined the possibility of using the so-called principle of parallelism of the competences and the Article 235 TEC.

The Court found that the accession would result in a "*changement substantiel*" (substantial change) of current Community system for the protection of the human rights as entered the Community in a distinct international institutional system and integrated. Such a change in the system of protection of fundamental rights to the Community would have a "*envergure constitutionnelle*" (constitutional feature) and, therefore, exceeded the limits of Article 235 TEC. Only an amendment to the Treaties through the ordinary revision procedure could allow the membership²⁹.

For over thirty years, the European Commission of Human Rights has absolutely excluded from its sphere of competence the analysis of prejudicial Community acts to the human rights protected by ECHR, creating a real "free zone" of protection of fundamental rights. It was a self restraint due to the lack of Community accession to the Convention.

Aware of the damage that had been created in the European system of protection of the human rights, the Commission, since the nineties, has inaugurated a timid shift in perspective expressed in various ways by the judgment M&Co³⁰, the Cantons³¹ and the Matthews³² judgments.

After the adoption of the controversial Opinion 2/94, the Court of Justice, influenced probably by the situation, issued three significant decisions heralding a rampant valorization of the ECHR and the Court at EU level.

The Court of Luxembourg made the first call to the jurisprudence of the European Court in its judgment *P v. S* in 1996³³. The Court decided in the case informing the definition of transsexual made by the Judge of Strasbourg in the case of *Rees v. United Kingdom* in 1986³⁴. Later, in the judgment *Familiapress*

of 1997³⁵, the Court of Justice has used a precedent of Strasbourg as a parameter of a delicate balance between two opposing corollaries of freedom of the press stated in the Article 10 ECHR. Again, in judgment *Baustahlgewebe* of 1998³⁶, the Judge of Luxembourg has solved the case in question through the prism of the jurisprudence of the Strasbourg Court on reasonable length of processes, guarantee provided by Article 6 ECHR.

In addition to the above-mentioned judgments in which the Court has made a «*emprunt*» the ECHR and the jurisprudence of his court, worthy of mention are some more recent decisions in which the court of Luxembourg has made a real «*revirement*» respect to positions taken in the past and antithetical to those adopted by his counterpart in Strasbourg³⁷.

However, there is no denying the evolution of case law on the fundamental rights facilitated by a simultaneous and progressive convergence of the Strasbourg jurisprudence on the positions taken by the counterpart of Luxembourg.³⁸

The progressive evolution of the relationship between the Luxembourg Court and the Strasbourg Court has led to an inevitable intertwining of the conventional and the EU system of protection of the human rights. The first confirmation of the "cross-fertilization"³⁹ between the two legal systems in question, there was with the judgment *Hornsby* in 1997⁴⁰. The judgment *Hornsby* has been also an important settlement of two other relevant judgments of the Court of Human Rights, *S. A. Dangeville* of 2002⁴¹ and *S. A. Cabinet Diot* of 2003⁴² in which the failure to comply with Community law becomes the primary reason for the sentence of the France by the European Court.

Another example of «*intégration douce*» between the ECHR system and the EU system of protection of the human rights by the "cross-fertilization" promoted by both Courts in regard to the recognition of English transsexuals to marry. In the case *Goodwin43*, the European Court has decided to sentence for the first time the UK for injury of Article 12 ECHR on the right to marry and found a family, providing a new interpretation of the provision in question, mainly inspired by the Community Court of Justice and the Charter of Nice. After a little less than two years, the Luxembourg Court in the case *K. B44*. has, for the first time, to scrutinize the merits of the British national legislation on marriage, considering the prohibition of discrimination laid down in the Article 141 TEC not only to the direct enjoyment of the rights guaranteed by the Treaty, but also to their assumptions. In order to corroborate its position, the Court made an express reference to the judgment *Goodwin* of the European Court: "the European Court of Human Rights has held that it is impossible for a transsexual to marry a person of the sex to which he or she belonged prior to gender reassignment surgery, which arises because, for the purposes of the registers

of civil status, they belong to the same sex, was a breach of their right to marry under Article 12 of the ECHR".

The relationship between the Strasbourg Court and its counterpart in Luxembourg would like to evolve through the prism of cooperation rather than in terms of dominance and power. Through the judgment *Bosphorus*⁴⁵, the Strasbourg Court, external actor, has self-invited in the legal system of the European Union. The Court of Human Rights has managed the operation to bring the European Union exactly where wanted it to be: that is bound to the ECHR. The relationship between the two European judges responds to a strictly hierarchical and competitive advantage of the Strasbourg Court.

The judgment *Bosphorus* could be seen as a kind of "technical proof" of the European Union's accession to the ECHR, without which the "development of relations between the two largest judicial protection of fundamental rights in Europe risks to be imperfect, although circular, as evidenced by two sentences respectively of the Court of Justice and the European Court: the *Kadi* and *Al Barakaat Foundation of September 3, 2008*⁴⁶ and the judgment *GC Demier and Baykara v. Turkey* of November 12, 2008⁴⁷. A parallel examination of this judgments highlighted the mutual permeability of EU and conventional systems with respect to their values which, because of the osmosis process, seem to lose their original marking, becoming true European values of constitutional order. Although the "judicial policy" of the two courts seem to have had the positive effect of facilitating «*douce intégration*» between the respective legal systems to protect the human rights and to contribute to the construction of a European inter-constitutional law, it would be basic and simplistic to interpret the relationship between European jurisdictions like a «*harmonie euphorique*». There is still a "congenital separation" between the two courts, and in the absence of a formal and legally binding mechanism of coordination between them, relations between Luxembourg and Strasbourg seem destined to evolve along the lines of a sterile circularity of mutual and suspicious respect.

III. EFFECTIVENESS OF FUNDAMENTAL RIGHTS UNDER THE LISBON TREATY

The EU accession to the ECHR is a decisive turning point in the EU law. Human rights had to accomplish a long path before become an essential element of community development, as demonstrated by the history of the last decade and, above all, by the Charter of Fundamental Rights of the European Union (2000), which had acquired binding value with the entry into force of the Lisbon Treaty (2009).

On 1st June 2010 entered into force the Protocol n.14 of the ECHR. Thanks to the new legal framework established by it, according to the amendment of Article

59, the access of European Union to the Convention, as established by Article 6 of the Treaty of Lisbon, will become possible. On 7 July 2010, therefore, began formal discussions aimed to membership of European Union to the ECHR. At the end of this process, the accession agreement will be signed by the Committee of Ministers of the Council of Europe and by the Council of the EU with the consent of the European Parliament. Once signed, the agreement must be ratified by all 47 parties to the Convention, including those that are also EU member states. It is a long path considering that today, at the end of 2012 and three years after the entry into force of the Lisbon Treaty and instead of the draft of legal instrument aimed to finalize the membership already prepared at the end of 2011, Article 6 still remains unrealized.

The EU's accession to the ECHR is necessary to ensure consistency between the case law of the two courts (the Court of Justice of the EU in Luxembourg and the European Court of Human Rights in Strasbourg), to submit the European norms to the same judgments in the same human rights standards of the 27 member countries, and to create a "common European space for human rights"⁴⁸.

Becoming the 48th signatory of the Convention, the Union will be heard in the cases examined by the European Court of Human Rights in Strasbourg, appointing a judge and giving to every European citizen, once carried out all the domestic remedies, a new possibility of appeal to this Court in cases of alleged breach of fundamental rights by the EU institutions.

As known, the question of accession of the European Union to the ECHR is a «*véritable arlésienne*»⁴⁹ of EU law, a goal that European scholars have attempted to pursue since the late 1970s of the last century.

In March 1996, the veto of the Court of Justice of the European Communities to conclude a Treaty regarding the "Accession of Union to the ECHR" slows down the achievement of that goal, but wasn't let to fall into oblivion. A fundamental step to strengthen the protection of the rights of citizens inside the Union and give "constitutional dignity" to the process of European integration, was arrived with the Charter of Nice. Then with the Laeken Convention in 2001 was given "the opportunity to incorporate the Charter of Fundamental Rights in the basic treaty and to put the question of the "European Community's accession to the European Convention on Human Rights". After long debates was deemed the need not to consider the Nice Charter and the European Convention on Human Rights as alternatives, but as complementary tools which presume a mutual reinforcement in the protection of human rights. The Charter was constitutionalized, becoming Part II of the Treaty establishing a Constitution for Europe and Article I-9 established the legal basis that would allow the Union to accede to the Convention.

Apparently failed under the blows of the French and Dutch referenda, the constitutional process has, however, produced significant effects largely inherited from the Treaty of Lisbon. In terms of protection of fundamental rights, there are three most important news, covered by the Constitution and "transplanted", with some modifications, in the new Treaty: the attribution of legal force to the Charter of Nice, the strengthening of the procedural legitimacy of individuals complementary to the extension of the powers of the Court of Justice and, finally, the introduction of the necessary legal basis to allow the accession of European Union to the ECHR.

The Lisbon Treaty, by operating a mere reference to the Charter, led to a de-constitutionalization of it, a *capitis diminutio* inserted in the logic of elimination of a series of constitutional symbols from the previous text, starting with the *nomen* of the Treaty that should have adopted a Constitution for Europe. In the new Lisbon Treaty, the Charter does not take neither the name of *treaty* nor *protocol* - names that have the same value from the legal point of view.

From a substantial point of view, the attribution of legal force to the Charter raised three issues regarding (1) the impact of the Charter on the competences of the Union, (2) the relationship between the Charter and the ECHR and (3) the "variable geometry"'s application of the Charter in accordance with the provisions of the British-Polish Protocol.

If we consider the practice of the Court of Justice, this has never prevail the reasons of the limits of competence on reasons of fundamental rights⁵⁰. Moreover, the Court of Justice aims to have the typical role of the constitutional courts, and would hardly be brought to abdicate the status of "constitutional jurisdiction of freedom" in favor of the exaltation of the principle of division of powers.

The rights recognized in the Charter which correspond to rights guaranteed by the ECHR have the same meaning and effectiveness of those incorporated in the last one, especially considering the detailed provisions of the ECHR which allow restrictions to these rights. The Article 52, paragraph 3 of the Charter makes it clear that this Article shall not preclude a more extensive protection already achieved or that could be established by the regulations of the Union or by some articles of the Charter which, although based on the ECHR, go beyond as far as the EU law has already reached a higher level of protection. Furthermore, according to the Article 53, the protection afforded by the ECHR is configured as minimum protection, being allowed a more extensive protection by the Charter of Nice. According to some scholars⁵¹, the reference to the ECHR and the case law of the Strasbourg Court, does not appear such as to exclude any conflict in the application of the provisions of the ECHR and the Charter of Rights by the Courts of Luxembourg and

Strasbourg and, more generally, between the EU system and that of the European Convention. Since these horizontal clauses would ensure consistency between the two instruments in the case of the rights recognized in both systems, several points remain obscure or at least unresolved⁵².

The Protocol n. 7 on implementing the Charter of Fundamental Rights to Poland and the United Kingdom has been defined as a text "totally useless from a legal point of view"⁵³, the adoption of which was affected only by the logic of domestic politics: the Warsaw government feared interference of the Union in its policies of moral order and the United Kingdom feared an extensive application of social rights established by Title IV of the Charter. From the protocol it emerged two macroscopic inconsistencies: a first aspect concerns the paradoxical recognition *expressis verbis* of the purpose of mere "codification" of the Charter of rights already existing at the level of Union. How could the United Kingdom and Poland invoke the Protocol in order to escape from Charter's obligations, since the ECJ, in most cases in which the Chart could serve as a parameter for considering English or Polish legislation incompatible with the European law.

Accession of the EU to the ECHR is a controversy stage in the European constitutional process and its membership will represent a further forward step in the judicial protection of fundamental rights and a complex structure of relations between the two European Courts. Accession was saw as a "political signal" of the great Europe to pursue a common aim, i.e. the protection of human rights into the European constitutional space. As an ad hoc instrument to ensure the effectiveness and consistency the judicial protection of fundamental rights in Europe, the adherence could have also disadvantages which threat the specificity of EU law. This is due to the fact that currently the protection of fundamental rights in Europe is affected by the non-coordinated interactions between the systems of Strasbourg and Luxembourg, in particular the lack of a formal link between the two European courts. The European Court of Human Rights may invoke the international responsibility of every member of the Union that is both part of the Convention, for the breach of the Convention, even if the source of the breach of law could be found in a national measure implementing the European Union legislation or in a European *tout court* act (cases *Matthews* and *Bosphorus*). In this situation, the Strasbourg Court is unable to prosecute the subject directly responsible for any breach of the ECHR, i.e. the Union. The accession of Union to the ECHR will allow the representation of the Union as such is, both into the Europe Court and into the Committee of Ministers of the Council of Europe, the body responsible for the monitoring of the execution by the member states of judgments of the Court. In addition, the risk of conflict of loyalties between States will be avoided, as being the

Union subject to the obligations of the Convention, in case of a conflict between the two systems, the ECHR norms have to be considered binding on the individual Member States and the unconventional acts of the Union will determinate specific responsibilities to assert themselves by the standard tools provided by the ECHR.

The accession of Union to the ECHR should lead the Strasbourg Court to standardize the control measures against national and European acts, ending the vicious policy of "double standards". To this should be added that the accession of Union to the ECHR guarantees to individuals the access to additional appeal against the acts of the European institutions which violate their fundamental rights⁵⁴.

But it could lead to both the loss of autonomy of European law, understood as independence from national and international law, that the alteration in the division of powers between Member States and Union. Concerning the first aspect, it was found that the autonomy of the EU law may be affected by the loss of the Court's role as the exclusive judge of European law, by the loss of the monopoly of the Court in the resolution of disputes between states and the submission of European institutions to the control of "third judge", non-European. As a result of accession, the Luxembourg Court could lose, first, the exclusive power to rule on the validity of European acts, as his counterpart in Strasbourg would be empowered to inspect such acts in terms of respect for the human rights. In terms of Article 33 of the Convention, the member states can submit to the judgment of the Strasbourg Court disputes arising between them, or between a State and a European institution thereby undermining the role of arbiter of the exclusive European order that Articles 292, 226 and 230 TCE established to the Judge of Luxembourg. Finally, one important critic of adherence is the fear that a non-European judge, member of the Strasbourg Court to whose control the Union would be subject, could judge not "knowingly". The possible drawback accession just now described do not appear to be fully justified or otherwise insurmountable. the European Court of Human Rights as an external judge to EU law, does not have the power to void EU acts or to invalidate the judgments of the Court of Justice, as well as does not have the right to cancel or set aside the rules and the national judgments. The jurisdiction of the Strasbourg Court is limited to detection of any breaches of the human rights by national acts, Europeans in the future, the Strasbourg Court will have to examine concrete cases related legislation and acts of Union which infringe the Convention, and when will decide, the Court must take into account the specific characteristics of the Union and EU law. Secondly, the risk that disputes between member states or between member states and the European Union are submitted directly to the knowledge of the Strasbourg Court according to the

Article 33 of ECHR, bypassing the jurisdiction of the Luxembourg Court, seems to be overcome by the provisions of the Protocol n. 8 attached to the Lisbon Treaty, which at Article 3 establish that "no provision of the Accession Agreement shall affect Article 344 TFEU which states that "Member States undertake not to submit a dispute concerning interpretation or application of the Treaties to any method of settlement other than those provided for therein."

The European Union's accession to the ECHR is configured also as essential step to achieve a consistent approach between the external dimension and the internal dimension of European policy on human rights. The paradox that had characterized the attitude of the Union, in fact, was to proclaim, on the one hand, a bastion of human rights both inside and outside of the EU, and to escape, on the other hand, in front of absence of a comprehensive and coherent design in this area, in both dimensions. Despite the fact that the main guardians of human rights continue to be the Member States, each within its own territory, it is true that the EU had become an active party, affirming the value of its effort in this direction on the international scene, influencing the third countries through cooperation and trade agreements, imposing strict requirements on human rights for the states that required the membership, and implementing a number of initiatives in support of human rights at the level of civil society, as the surveillance of the elections or the monitoring activities. In any case, at least until the middle of the decade, the European Union continued to lack a policy for human rights fully autonomous in both dimensions.

Between 1995-2005 there has been a significant evolution with respect to human rights in external and internal relations, with the achievement of a comprehensive, coherent and horizontal approach in this area. In this field, and for all the nineties, EU policies have proved just credible enough to suggest a real abdication of responsibility by the Union. On the one hand, remained an important issue of competences between the EU and Member States, fearful in respect of any loss of sovereignty in this field (also because of the fact that human rights is a branch growing and potentially extendable to every sphere of life), the risk could, in fact, be to exceed the constitutional powers of the Union, limited to a small number of human rights. The rhetoric used by the Union in the external relations regarding the importance of human rights, of their universality and indivisibility, helped to undermine the Union's operate, making manifest the incoherency and vulnerability. In this way, the Union became easily attacked by using the criterion of "two weights, two measures" in this context, demanding a lot from non-member countries, and thus applying a higher standard in external relations, and then tend to disappear in domestic issues relating to the same countries that

make it up. Commercial and economic power, and therefore called upon to fulfill a role of responsibility in the field of human rights, the Union would not had to give up its role as defender of these rights, and the role that tried to interpret in multilateral frameworks or relations with third countries, and then reiterate its lack of general competence, as soon as we moved to the internal level.

Seen in this light, then, the question of the accession of the Community to the ECHR became a manifestation of this contradiction. This is especially true when it considers that the principles of liberty, democracy, human rights and rule of law was made a condition for the accession of new Member States and their membership in the Convention system as a prerequisite to access request. On the contrary, the EU's accession to the ECHR would be able to submit Union's action to the scrutiny of the Strasbourg Court of Human Rights, if the EU institutions will not be vigilant enough, including the Court of Justice. In addition, in accordance with the criteria of the indivisibility and universality, the internal and the external dimension should be two sides of the same coin.

The big loop that European human rights faced after 2000 is constituted, not only and not so much, in terms of recovering the historical delay accumulated in the internal dimension in respect of the acceleration by developments in external relations; it now resided in the need to make these two aspects mutually complementary.

The orientation of the Strasbourg Court vis-à-vis the control of EU acts shows that the interference zones within the jurisdiction of the Luxembourg and Strasbourg Courts are still «*suscetibles de s'accroître*». Over the years there has been a mutual cooperation in order to harmonize their legal guidelines and eliminate the seeds of inconsistency inherent in the duality of mechanisms of protection.

From a technical and legal point of view, the accession of European Union to the ECHR, as was pointed out by the Steering Committee of the human rights, involves not only some amendments of the text of the Convention and the Protocols, but also modest administrative reforms. With regard to the amendments to the Convention, it must be called up the ECHR norms regarding the accession (Article 59) and the enforcement of judgments of the Court of Human Rights (Article 46). Regarding the Article 59 of the Convention, only the member states of the Council of Europe can sign and ratify the Convention. The statutory provision in question has been changed from Article 17 of Protocol n.14. Regarding the participation of the European Union to the Committee of Ministers, the body responsible for monitoring the execution of final judgments of the Court, it should be noted that the Article 46, paragraph 2 of the ECHR confers the right to vote in that body solely to the member states of the Council of Europe, in accordance

to Article 14 of the Statute. Therefore, to enable the Union to participate actively in the Committee, in theory it would be necessary, not only a revision of the Convention, but also an amendment to the Statute of the Council. It would be appropriate that the right to vote of the European Union in the Committee of Ministers would not be limited only to EU issues but would include all matters discussed by the Committee in the enforcement of judgments of the European Court.

The membership of the Union to the ECHR raises problems of terminology that does not seem, however, to impose a reform of the Convention text.

First, the terms state and nation, or national security and economic well-being of the country contained in certain articles of the Convention should be adapted to the presence of the European Union as a new member. Since an ad hoc revision of each provision of the Convention would require a disproportionate effort compared to the scope of terminological inaccuracies, such *defaillance* of the text could be overcome with the adoption of a general clause of interpretation in order to clarify that these terms shall be applied *mutatis mutandis* to the European Union.⁵⁵

Then, with regard to the participation of the Union to the proceedings held before the Strasbourg Court, at least two aspects are relevant. First, in case of an appeal to the European Court directed against the Union, this may participate in the process as a defense - an expert judge in European law would be nominated for (*au titre de*) the Union, whose special status was excluded by virtue of the principle of equality on which is based the entire conventional system. The judge of the Union shall enjoy the same status as a representative judge as other contracting parties, ensuring the representation of all legal systems, the contribution of each party to the collective guarantee mechanism established by the Convention and reinforces the legitimacy of the decisions taken by the Court. Second, according to the Article 36, first paragraph of the ECHR, the Union should have the right to participate in the hearings as a third party, in cases where the petitioner is a citizen. This situation does not involve a revision of the Convention but it could be settled by an agreement between the European Union and its member states, or better, in the context of the Accession Treaty.

With regard to the bureaucratic-administrative amendments, it is enough to mention the issue of the financial contribution of the European Union to the costs of operation of the control mechanism of the Convention: that question doesn't require an amendment of the Article 50 of the Convention and could be resolved by the adoption of an ad hoc provision that contains an enabling legal basis.

From a substantive point of view, the membership of the European Union to the ECHR, according to some scholars⁵⁶, may have a negative

effect on the functioning of the mechanism of protection of fundamental rights created by the Convention because of the possible increase of individual appeals to the Strasbourg Court. But also this problem is overcome by the Protocol n.14 which provides the strengthening of the capacity to filter individual complaints, a more efficient process of categorizing the repetitive appeals and the new condition of admissibility in base of the prejudice suffered by the petitioner.

The analysis of the impact of the construction of a bridge between the legal and institutional systems of Strasbourg and Luxembourg seems to "demystify" the question of accession, demonstrating not only that it is legally realistic but also desirable. At this stage of negotiations, an evaluation of perspective on the post-accession in the European constitutional space is essential: the new legal relationship between the two para-constitutional Courts will be able to ensure consistent and effective protection of fundamental rights in Europe? Undoubtedly, there seems clear that the accession of European Union to the ECHR, resulting in a major change in the relationship between inter-institutional systems of Strasbourg and Luxembourg, will help to amplify the standard of protection of fundamental rights in the European constitutional space.

Decided the accession of the Union, the discussion is now open with regards the modalities to realize it, taking into account the particular nature of the Union without distort the uniform protection of human rights in Europe. Many actors - not only within the Union - intervene in the process that opens. Technical aspects of the problems and possible solutions will overlap the political dimension of such an event for the Union and its 27 Member States, and for the Council of Europe and its 47 member states.

IV. CONCLUSIONS

As a result of establishment of a mechanism for formal connection between the Courts of Luxembourg and Strasbourg, the accession will help to raise the standard of protection of the human rights of in the European constitutional space on condition that there will be eliminated a series of legal and formal obstacles. By a "convergence (only) parallel" between their jurisprudential you went to a flawed integration between the system of Strasbourg and the Luxembourg, heralding further flaws in the protection of fundamental rights. The lack of a legal and institutional link between the Union's system and the ECHR, has set up a sort of immunity from jurisdiction in the hands of the European institutions even though their acts are liable to be sued before the Strasbourg Court for violation of human rights.

Effectiveness also means homogeneity of the means of protection, so if the instrument is not uniform, the protection will inevitably be inconsistent. Such considerations explain, therefore, the favor shown by the

writer towards the creation of a bridge between the institutional-regulatory system of Strasbourg and the Luxembourg, a definitive *actio finium regundorum*. But, as noted, the accession of European Union to the ECHR raises a number of procedural and substantial problems whose solution is a *conditio sine qua non*, so that the 'missing link' created by the Lisbon Treaty brings the desired effects.

The accession will have to follow a long and complex procedure and will be subject to the unanimous approval of the Member States of the European Union. The Council of Europe, for its part, will have to implement significant institutional changes to allow the representation of the Union within the Court and the Committee of Ministers. Formal and technical issues raised by accession, although solvable, definitely require time-consuming and an accentuated collaboration and spirit of solidarity between Member States.

On the substantive level, the concrete partnership of the Courts of Strasbourg and Luxembourg within of the new legal framework designed by the Lisbon Treaty must, in fact, ensure a harmonious and uniform protection of fundamental rights in the following two different tools: the Charter of Nice and the European Convention of Human Rights. Only through a regular cooperation between the two European Courts it could be resolved the potential contradictions and conflicts of interpretation that the presence of two different Bill of Rights will be able to cause. The Judges of Luxembourg and Strasbourg will facilitate the transition from a forced cooperation between them to a co-forced one, in line with the new European constitutionalism characterized by a multicenter network of relations between courts, increased by the principle of loyal cooperation. It is not ruled out a healthy competition between the courts for the seizure of "constitutional primacy" in Europe of rights; this would be a beneficial competition especially for the EU law.

The European Union assumes a policy, legal and cultural liability, a responsibility that can only encourage the evolution and that, in fact, means that fundamental rights are at the base of a new socio-cultural perspective. The Union's presence as an independent subject in the Convention could mean the beginning of a renewed awareness of the meaning of common European citizenship, could pave the way for a development of doctrine in the field of fundamental rights such as to mark the opening of a new chapter for integration, as well as providing an important tool for foreign policy, with which to enforce respect for human rights, at least in the area of ECHR.

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Pixel Purity Index Algorithm and n-Dimensional Visualization for ETM+ Image Analysis: A Case of District Vehari

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Abstract - The hyperspectral image analysis technique, one of the most advanced remote sensing tools, has been used as a possible means of identifying from a single pixel or in the field of view of the sensor. An important problem in hyperspectral image processing is to decompose the mixed pixels into the information that contribute to the pixel, endmember, and a set of corresponding fractions of the spectral signature in the pixel, abundances, and this problem is known as un-mixing. The effectiveness of the hyperspectral image analysis technique used in this study lies in their ability to compare a pixel spectrum with the spectra of known pure vegetation, extracted from the spectral endmember selection procedures, including the reflectance calibration of Landsat ETM+ image using ENVI software, minimum noise fraction (MNF), pixel purity index (PPI), and n-dimensional visualization. The Endmember extraction is one of the most fundamental and crucial tasks in hyperspectral data exploitation, an ultimate goal of an endmember extraction algorithm is to find the purest form of spectrally distinct resource information of a scene.

Keywords : *Algorithm, endmember, fraction, Landsat, MNF, n-dimension, PPI, remote sensing.*

GJHSS-A Classification : *FOR Code: 090905*



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Farooq Ahmad ^α & Qurat-ul-ain Fatima ^σ

Abstract - The hyperspectral image analysis technique, one of the most advanced remote sensing tools, has been used as a possible means of identifying from a single pixel or in the field of view of the sensor. An important problem in hyperspectral image processing is to decompose the mixed pixels into the information that contribute to the pixel, endmember, and a set of corresponding fractions of the spectral signature in the pixel, abundances, and this problem is known as un-mixing. The effectiveness of the hyperspectral image analysis technique used in this study lies in their ability to compare a pixel spectrum with the spectra of known pure vegetation, extracted from the spectral endmember selection procedures, including the reflectance calibration of Landsat ETM+ image using ENVI software, minimum noise fraction (MNF), pixel purity index (PPI), and n-dimensional visualization. The Endmember extraction is one of the most fundamental and crucial tasks in hyperspectral data exploitation, an ultimate goal of an endmember extraction algorithm is to find the purest form of spectrally distinct resource information of a scene. The endmember extraction tendency to the type of endmembers being derived, and the number of endmembers, estimated by an algorithm, with respect to the number of spectral bands, and the number of pixels being processed, also the required input data, and the kind of noise, if any, in the signal model surveying done. Results of the present study using the hyperspectral image analysis technique ascertain that Landsat ETM+ data can be used to generate valuable vegetative information for the District Vehari, Punjab Province, Pakistan.

Keywords : Algorithm, endmember, fraction, Landsat, MNF, n-dimension, PPI, remote sensing.

I. INTRODUCTION

The recent developments in remote sensing technology have witnessed two major trends in sensor improvement (Qiu et al., 2006). The hyperspectral imaging (Shippert, 2003) is concerned with the measurement, analysis, and interpretation of spectra acquired from a given scene at a short, medium or long distance by an airborne or satellite sensor (Goetz et al., 1985; Aspinall et al., 2002). The pixel purity index (González et al., 2010; Pal et al., 2011) allows for spatial data reduction. The pixels in the image that represent the 'most pure' spectral signatures are identified and subset from the mass majority of pixels

representing mixed pixels. A 'pure' pixel, also known as an endmember (Nascimento and Dias, 2005), can be envisioned as a homogenous area greater in spatial extent than the image pixel size, so that the recorded signal for that pixel represents a spectral profile for single surface information (Boardman, 1993; Boardman et al., 1995). It assumes that the pixel-to-pixel variability in a scene results from varying proportions of spectral endmembers (Rogge et al., 2007). The spectrum of a mixed pixel can be calculated as a linear combination of the endmember spectra weighted by the area coverage of each endmember within the pixel, if the scattering and absorption of electromagnetic radiation is derived from a single component on the surface (Keshava and Mustard, 2002; Rogge et al., 2007). Image endmembers are pixel spectra that lie at the vertices of the image simplex in n-dimensional space. Imagery may provide similarly meaningful endmembers that can be considered 'pure' or relatively 'pure' spectra, meaning that little or no mixing with other endmembers has occurred within a given pixel (Rogge et al., 2007). A mixed pixel is a picture element representing an area occupied by more than one ground cover type (Mozaffar et al., 2008). Spectral unmixing represents a significant step in the evolution of remote decompositional analysis that began with multispectral sensing (Shippert, 2003). It is a consequence of collecting data in greater and greater quantities and the desire to extract more detailed information about the resource composition (Keshava and Mustard, 2002). Spectral analysis extracts useful information might have missed otherwise from the raw pixel values of medium and high resolution imagery and can reveal hidden information locked in the pixels of imagery (Keshava and Mustard, 2002; Shippert, 2003).

The hyperspectral imagery provides opportunities to extract more detailed information than is possible using traditional multispectral data. The future of hyperspectral remote sensing is promising (Shippert, 2003). As newly commissioned hyperspectral sensors provide more imagery alternatives, and newly developed image processing algorithms provide more analytical tools, hyperspectral remote sensing is positioned to become one of the core technologies for geospatial research (Shippert, 2004), exploration, and monitoring.

Hyperspectral images have been used to detect soil properties including moisture, organic content, and

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salinity (Ben-Dor et al., 2002). Vegetation scientists have successfully used hyperspectral imagery to identify vegetation species (Clark and Swayze, 1995), study plant canopy chemistry (Aber and Martin, 1995; Shippert, 2003), and detect vegetation stress.

a) *Study Area*

The District Vehari (Figure 2 and 8) lies between 29° 36' and 30° 22' North latitude and 71° 44' and 72° 53' East longitude (GOP, 2000). The district is bounded on the north by and Khanewal and Sahiwal, on the east by Pakpattan, on the south by Bahawalpur and Bahawalnagar, on the west by Lodhran and Khanewal.

II. RESEARCH DESIGN AND METHODS

In this research paper Landsat ETM+ scene 2003 for the District Vehari (path 150, row 39) was used for hyperspectral image analysis. In order to use this scene, several steps were followed to prepare for an accurate extraction of vegetation endmember. These vital steps are: image registration, geometric correction, radiometric enhancement, and histogram equalization as discussed by Macleod and Congalton (1998), Mahmoodzadeh (2007) and Al-Awadhi et al., 2011. The scene was corrected and geo-referenced using projection UTM, zone 43 and datum WGS 84. Atmospheric correction operation was performed using ENVI software. Further, Minimum Noise Fraction (MNF), Pixel Purity Index (PPI), n-Dimensional Visualizer (n-DV) and Endmember Extraction technique has been used for hyperspectral image analysis (Figure 1).

The Pixel Purity Index (PPI) technique was adopted using ENVI 'automated spectral hourglass' application upon ETM+ image. The PPI was applied upon the full scene of the district. In this experiment 22,948,704 pixels were operated (Figure 3 and 4) using Automated Hourglass Parameters: Number of MNF bands to use: 6 (excluding Thermal IR and Panchromatic); Number of PPI Iterations: 5,000; PPI Threshold Value: 2.500; Maximum number of PPI Pixels to use for Endmember Selection: 10,000; and Mapping Methods were selected: Mixture Tuned Matched Filtering (MTMF), Spectral Angle Mapper (SAM), and Unmixing. The Endmembers were selected for processing flow, a series of tools that use the spectrally over-determined nature of hyperspectral data to find the most spectrally pure or spectrally unique pixels within the dataset. This set of endmember signatures (Bateson and Curtiss, 1996; Bateson et al., 2000) was then used in the full range of mapping algorithms available in ENVI to determine locations, and in some cases subpixel abundances of endmembers (Harris, 2006).

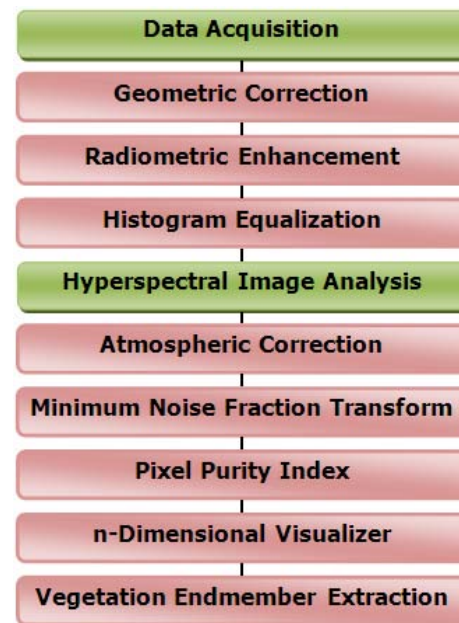


Figure 1 : Scheme for hyperspectral image analysis.

The hyperspectral imaging, also known as imaging spectrometry, is now a reasonably familiar concept in the world of remote sensing. Hyperspectral images are spectrally providing ample spectral information (Shippert, 2003) to identify and distinguish between spectrally similar resource information. Consequently, hyperspectral imagery provides the potential for more accurate and detailed information extraction than is possible with other types of remotely sensed data (Shippert, 2004). Standard multispectral image processing techniques were generally developed to classify multispectral images into broad categories of surface condition. Hyperspectral imagery provides an opportunity for more detailed image analysis. Boardman (1993) and Boardman et al. (1995) were among the first to develop and commercialize a sequence of algorithms specifically designed to extract detailed information from hyperspectral imagery (Shippert, 2004). ENVI tools, applicable to a variety of applications, distinguish and identify the unique resource information present in the scene and map them throughout the image (Research System, Inc., 2004).

III. RESULTS

The hyperspectral imaging is a new emerging technology in remote sensing which generates hundreds of images, at different wavelength channels, for the same area on the surface of the Earth (Goetz et al., 1985; González et al., 2010; Sánchez and Plaza, 2010). The concept of hyperspectral imaging originated at NASA's Jet Propulsion Laboratory in California, which developed instruments such as the Airborne Imaging Spectrometer (AIS), then called AVIRIS, for Airborne Visible Infrared Imaging Spectrometer (Green et al., 1998). This system is now able to cover the wavelength

region from 0.38 to 2.5 μm or 380 nm to 2500 nm using two hundred twenty four spectral channels, at nominal spectral resolution of 10 nm (González et al., 2010).

The Pixel Purity Index (PPI) is a new automated procedure in the hyperspectral analysis process (Boardman, 1993; Boardman et al., 1995) for defining potential image endmember spectra (Bateson and Curtiss, 1996) for spectral unmixing (Lillesand and Kiefer, 2000). When image spectra are treated as points in n-dimensional spectral space, endmember spectra should lie along the margins of the data cloud (Microlimages, Inc., 1999; Berman et al., 2004). The PPI creates a large number of randomly oriented test vectors anchored at the origin of the coordinate space. The spectral points are projected onto each test vector, and spectra within a threshold distance of the minimum and maximum projected values are flagged as extreme (Nascimento and Dias, 2005). As directions are tested, the process tallies the number of times an image cell is found to be extreme (Miao and Qi, 2007). Cells with high values in the resulting PPI raster should correspond primarily to 'edge' spectra (Chang et al., 2006). The PPI raster then can be used as a mask to control input to the n-dimensional visualizer (Microlimages, Inc., 1999; Zhang et al., 2008).

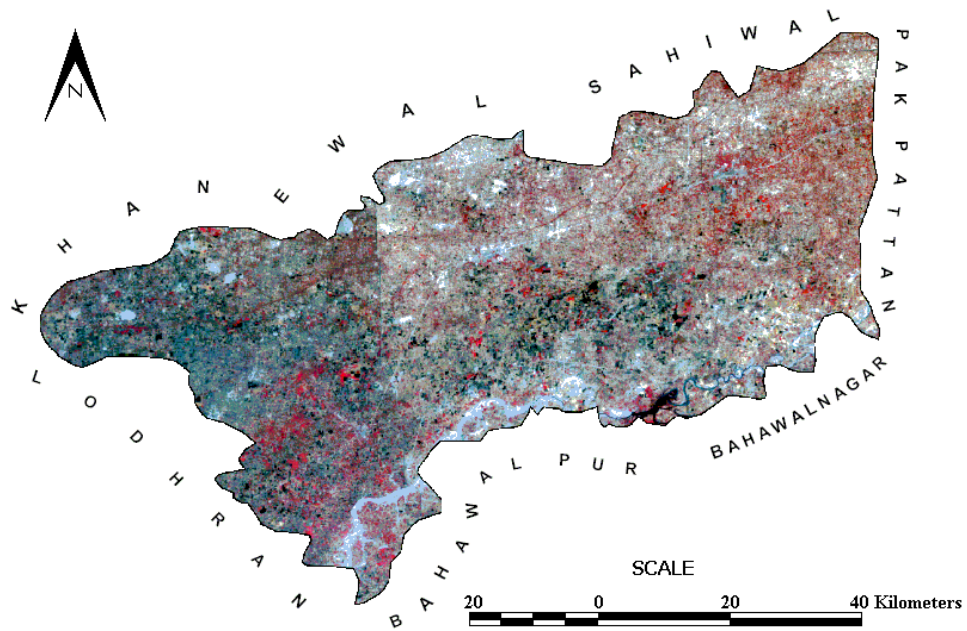
The most commonly used endmember extraction (Figure 5, 6 and Table 1, 2) tool is pixel purity index, which searches for vertices that define the data volume in n-dimensional space (Rogge et al., 2007). Commonly the first step of PPI is to apply MNF (Lee et al., 1990) to reduce the dimensionality of the data set (Green et al., 1988; Rogge et al., 2007). The MNF transform is used to determine the inherent dimensionality of image data, to segregate noise in the data, and to reduce the computational requirements for subsequent processing (Boardman and Kruse, 1994). The transformation based on an estimated noise covariance matrix, decorrelates and rescales the noise in the data (Research Systems, Inc., 2003; 2004). This step results in transformed data in which the noise has unit variance and no band-to-band correlations. For the purposes of further spectral processing, the inherent dimensionality of the data is determined by examination of the final eigenvalues and the associated images. The data space can be divided into two parts: one part associated with large eigenvalues and coherent eigenimages, and a complementary part with near-unity eigenvalues and noise-dominated images. By using only the coherent portions, the noise is separated from the data, thus improving spectral processing results (Research Systems, Inc., 2001; 2004).

Spectra can be thought of as points in an n-dimensional scatter plot, where n is the number of bands (Boardman et al., 1995). The coordinates of the points in n-space consist of 'n' values that are simply the spectral radiance or reflectance values in each band for a given pixel. The distribution of these points in n-space

can be used to estimate the number of spectral endmembers and their pure spectral signatures (Research Systems, Inc., 2001). The scatter plot (Figure 7) is an important tool for exploring an image and helping to understand some of the spectral characteristics of features in an image. The two dimensional scatter plotting tool allows comparing not only the relationship between the data values in two selected bands but also the spatial distribution in the image of pixels in any area of the scatter plot. This combined functionality provides a very simple, two-band, interactive classification of image data (Research Systems, Inc., 2004).

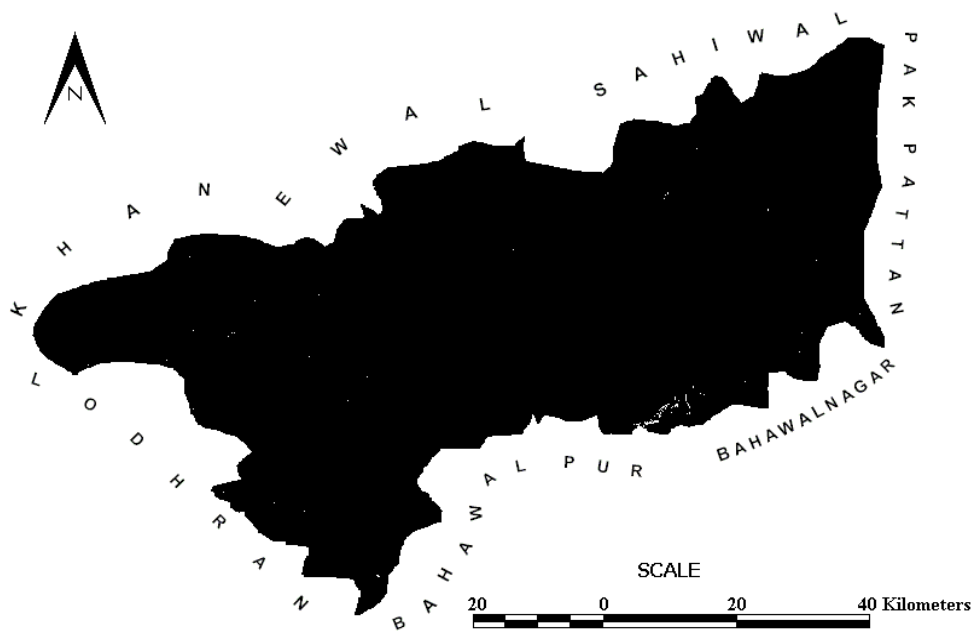
Spectral unmixing (Figure 9) algorithms (Lillesand and Kiefer, 2000; Rogge et al., 2006) use a variety of different statistical procedures to endmember extraction and estimate abundances. Unmixing problem comprises three sequential steps: dimension reduction, endmember determination, and inversion (Chang and Plaza, 2006). Because hyperspectral scenes can include extremely large amount of data, some algorithms for spectral unmixing first use image itself to estimate endmembers present in the scene. The dimension-reduction stage reduces the dimension of the original data in the scene (Cochrane, 2000; Mozaffar et al., 2008). The noise estimate can come from one of three sources; from the dark current image acquired with the data, from noise statistics calculated from the data (Richards and Jia, 1999), or from statistics saved from a previous transform. Both the eigenvalues and the Minimum Noise Fraction (MNF - Figure 10) images (eigenimages) are used to evaluate the dimensionality of the data (Qiu et al., 2006). Eigenvalues for bands that contain information will be an order of magnitude larger than those that contain only noise. The corresponding images will be spatially coherent, while the noise images will not contain any spatial information (Research Systems, Inc., 2004; Qiu et al., 2006).

Figure 2 : District Vehari - Landsat ETM+ 2003 image.



Source : <http://glovis.usgs.gov/> (Accessed on December 04, 2008) Processed by the author.

Figure 3 : Showing the endmember pixels extracted by the PPI for the District Vehari.



Processed by the author.



Table 1 : Showing selected endmembers data.

Bands	nD Class 1-2	nD Class 2-3	nD Class 3-4	nD Class 4-5	nD Class 5-6	nD Class 6-7	nD Class 7-8
1	81	74	75	84	74	76	76
2	68	62	62	84	61	64	66
3	78	66	67	99	69	74	75
4	70	57	68	77	71	86	64
5	255	103	255	48	255	255	109
8	1	255	255	38	1	1	255

Table 2 : Showing selected endmembers (MNF).

Bands	nD Class 1-2	nD Class 2-3	nD Class 3-4	nD Class 4-5	nD Class 5-6	nD Class 6-7	nD Class 7-8
1	-45.668144	-9.559686	-13.362324	-42.251820	-40.435787	-43.774044	-11.297052
2	-3.265855	-0.914537	18.957897	-11.722809	3.940382	14.638547	4.918655
3	15.752277	-29.919695	-23.210220	-2.429869	20.311623	26.381514	-31.349176
4	296.551239	-137.255051	52.496872	-22.368624	294.801758	282.927765	-135.733566
5	-27.440727	146.126907	160.149399	-48.182602	-19.783876	-24.758867	136.516922
6	139.244019	-62.703640	27.703362	1.272109	137.308945	129.952774	-63.861103

Figure 4 : Showing Pixel Purity Index Plot for the District Vehari.

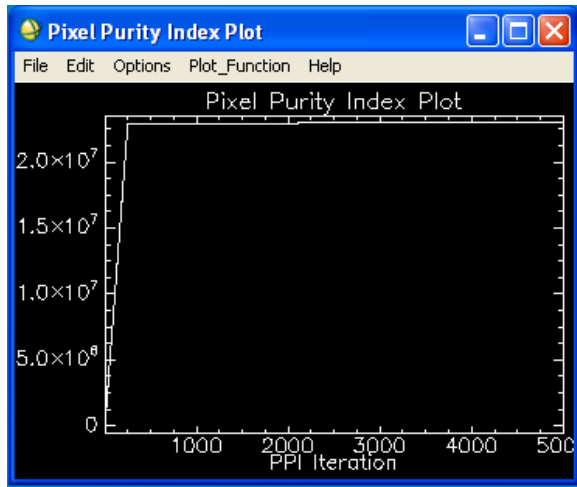


Figure 5 : Showing selected endmembers data.

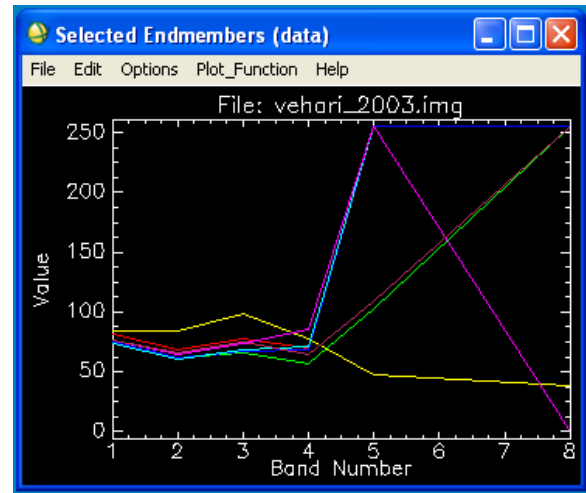


Figure 6 : Showing selected endmembers (MNF).

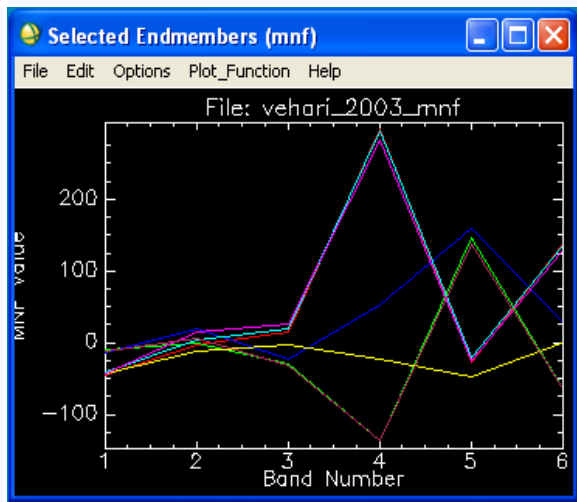
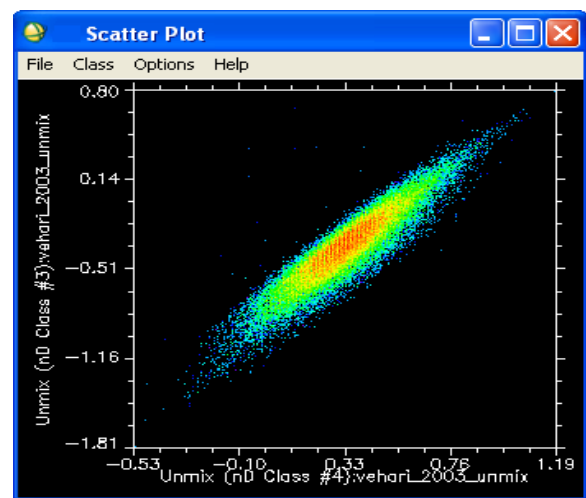


Figure 7 : 2-D scatter plot applied upon unmixing using band X 4 and band Y 3.



The Mixture Tuned Matched Filtering (MTMF - Figure 11) algorithm builds upon the strengths of both matched filtering and spectral unmixing while avoiding the disadvantages of both (Boardman, 1998). Matched filtering performs partial unmixing and identifies abundance of spectral endmembers without knowing background endmember signatures (Harsanyi and Chang 1994; Boardman et al., 1995). Matched filtering does not distinguish rare spectral targets very well and assumes an additive signal based upon radio/radar applications. Spectral unmixing takes advantage of the hyperspectral leverage to solve the linear mixed pixel problem, but traditional spectral unmixing techniques require knowledge of all of the background endmembers (Boardman, 1993; Bateson and Curtiss, 1996; Bateson et al., 2000). Incorporating convex geometry concepts, mixtures must be non-negative and unit-sum helps identify false positives, unrealistic mixtures, and maps subpixel fractional abundances.

The Minimum Noise Fraction (MNF) data reduction transform and Mixture Tuned Matched Filtering (MTMF) partial unmixing classification algorithm are relatively new image processing techniques that have proven to be effective target detection tools (Research Systems, Inc., 2004). These techniques allow partial unmixing and subpixel target abundance estimation, products that cannot be achieved using spectral angle mapping algorithms (Mundt et al., 2007).

The n-dimensional visualizer serves as an interactive tool for multidimensional analysis and identification of spectral endmembers (Tompkins et al., 1997; Plaza et al., 2002). The data are displayed in a defined number of dimensions and spectral

endmembers are identified as pixels that are located at the corner vertices (Tsai and Philpot, 1998). The n-dimensional visualizer second round of spatial data reduction designed to identify particular pixels or group of pixels that represent the purest spectra within the image. These pure spectra are exported and saved as ROI's that can be used for subsequent image classification techniques.

The n-dimensional visualizer was used to interactively locate, identify, and cluster the most spectrally pure or unique pixels in the image by visualizing those pixels selected from the PPI as points in a multidimensional scatter plot (Figure 7), where the number of dimensions was defined by the total number of coherent MNF bands (Boardman, 1993; Harris, 2006). The advantage of the n-dimensional visualizer was that it allowed visualization of points in an n-dimensional space, forming a data 'cloud' (Berk et al., 1998; Harris, 2006).

Advantages of this technology include both the qualitative benefits derived from a visual overview, and more importantly, the quantitative abilities for systematic assessment and monitoring (Shippert, 2003). A considerable number of mixed pixels are present in any remotely sensed image (Mozaffar et al., 2008). Several research objectives were accomplished :

- Select optimal bands in hyperspectral images those are most useful in vegetation classification,
- Identify optimal endmember, signature spectrum that represents a certain class, for vegetation classification, and
- Test effective endmember extraction algorithms for classification of vegetation type.

Figure 8 : Landsat ETM+, District Vehari.

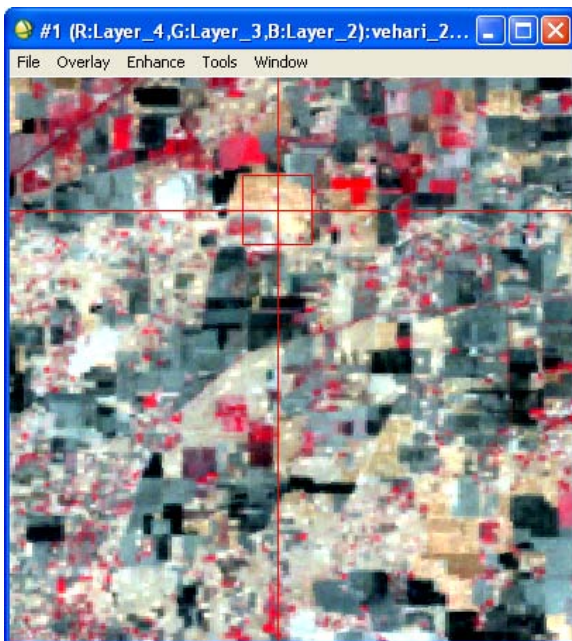


Figure 9 : Image showing unmixing.

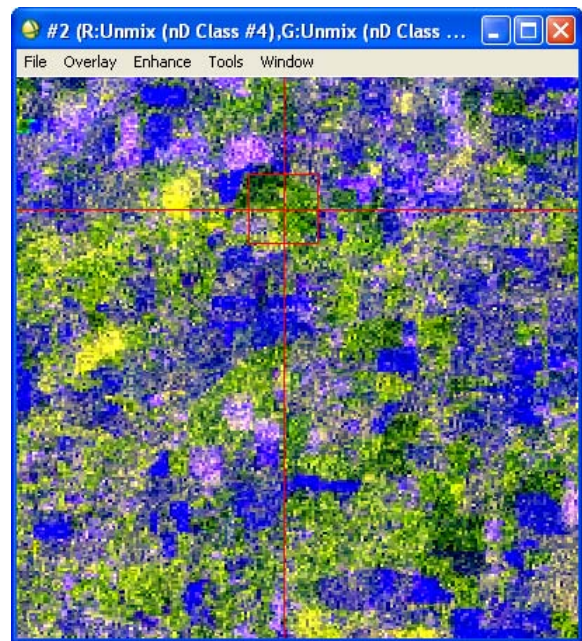


Figure 10 : Image showing minimum noise fraction (MNF).

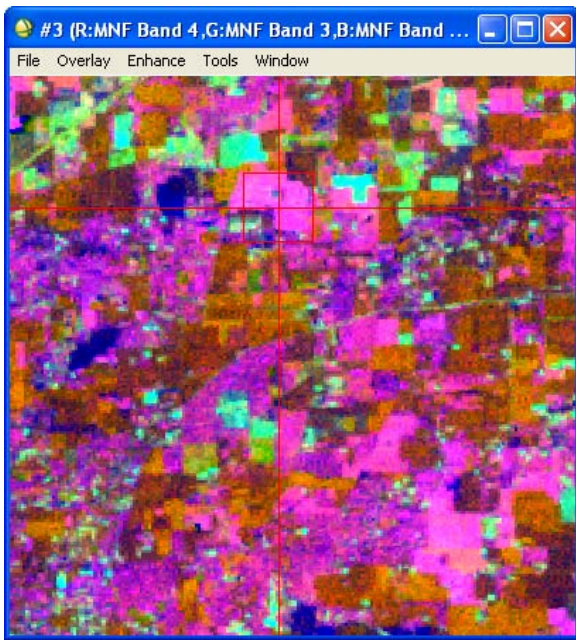
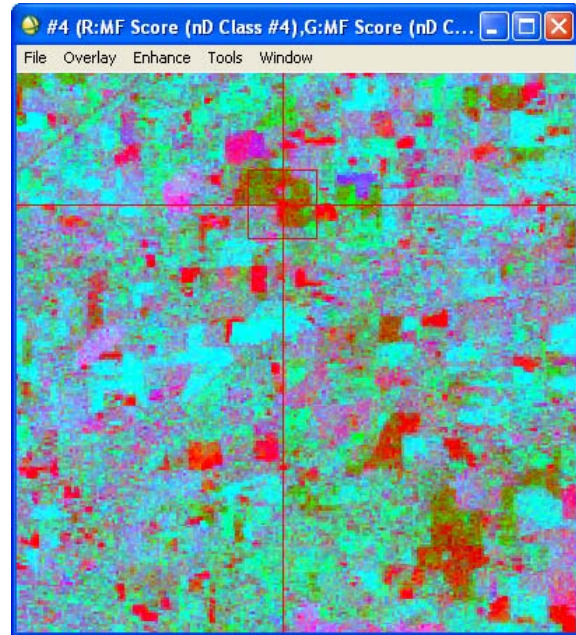


Figure 11 : Image showing mixture tuned matched filtering (MTMF).



IV. DISCUSSION AND CONCLUSIONS

The potential of hyperspectral remote sensing is exciting; there are special issues that arise with this unique type of imagery. For example, many hyperspectral analysis algorithms require accurate atmospheric corrections to be performed. To meet this need, sophisticated atmospheric correction algorithms have been developed to calculate concentrations of atmospheric gases directly from the detailed spectral information contained in the imagery (Roberts et al., 1993; Cochrane, 2000; Okin et al., 2001; Riano et al., 2002) itself without additional ancillary data. These corrections can be performed separately for each pixel because each pixel has a detailed spectrum associated with it. Several of these atmospheric correction algorithms are available within commercial image processing software (Shippert, 2004). However, several image analysis algorithms have been successfully used with uncorrected imagery (Shippert, 2003).

The MNF transform applied to the ETM+ data achieved a reasonable separation of coherent signal from complementary noise, therefore the MNF transformed eigenimages were employed and coupled with pixel purity index and n-dimensional visualization techniques to facilitate the extraction of the endmembers (Song, 2005; Qiu et al., 2006). After applying PPI thresholding, the data volume to be analyzed has been effectively reduced (Zhang et al., 2000). However, it is still possible that many less 'pure' pixels have crept in as candidate endmembers during the automatic selection process. All the pixels that were

previously selected using the PPI thresholding procedure are displayed as pixel clouds in the n-dimensional spectral space (Welch et al., 1998). To make possible the visualization of a scatter plot with more than two dimensions, the pixel clouds of high dimensions are cast on the two-dimensional display screen (Kruse et al., 1993; Tu et al., 1998). To effectively extract endmembers from high dimensional remote sensing data (Plaza et al., 2004) and to effectively process the data, it is often necessary that the dimensionality of the original data be decreased and noise in the data be segregated first, so the visualizing complexity and computational requirement for the subsequent analysis can be reduced (Kalluri et al., 2001; Qiu et al., 2006). This is often achieved through applying a minimum noise fraction transform to the high dimensional data (Qiu et al., 2006).

The hyperspectral sensors and analysis have provided more information from remotely sensed imagery than ever possible before. As new sensors provide more hyperspectral imagery and new image processing algorithms continue to be developed, hyperspectral imagery (Shippert, 2003) is positioned to become one of the most common research (Shippert, 2004), exploration, and monitoring technologies used in a wide variety of fields.

This paper has investigated the usage of ETM+ data for vegetation cover analysis of a semi-arid area in Pakistan. Landsat ETM+ data provide rich spectral information content. The open availability of Landsat data makes it attractive choice for many researchers in Pakistan. The hyperspectral image analysis technique

employed was implemented based on the comparison of a pixel spectrum with the spectra of known pure resource information, which can be effectively extracted using endmember selection procedures such as minimum noise fraction, pixel purity index and n-dimensional visualization.

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Monitoring Aggression in Adolescents: Yoga As A Panacea

By Dr. Anita Sharma

Himachal Pradesh University, Shimla

Abstract - An Anova of the order of $2 \times 2 \times (2)$ with repeated measure was employed in the present research to gauge the effect of yogic exercises if any between the control group and the experimental group in the two genders from pre to post test on different types of aggression. This investigation used a complete package of multiple counselling techniques to normalize aggression. The sample consisted of 100 school students (50 males, 50 females) from Shimla district of H.P. between the ages of 14 to 17 years. the main findings are: 1) The main effects of group, gender and treatment have turned out to be significant at .05 and .01 levels; 2) the interaction effects of treatment x group and treatment x gender have also yielded significant F ratios thereby revealing the significant impact of interventions in monitoring the aggression.

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Abstract - An Anova of the order of 2x2x(2) with repeated measure was employed in the present research to gauge the effect of yogic exercises if any between the control group and the experimental group in the two genders from pre to post test on different types of aggression. This investigation used a complete package of multiple counselling techniques to normalize aggression. The sample consisted of 100 school students (50 males, 50 females) from Shimla district of H.P. between the ages of 14 to 17 years. the main findings are: 1) The main effects of group, gender and treatment have turned out to be significant at .05 and .01 levels; 2) the interaction effects of treatment x group and treatment x gender have also yielded significant F ratios thereby revealing the significant impact of interventions in monitoring the aggression.

I. INTRODUCTION

Offensive behaviour or aggression among children and adolescents is a significant clinical and social problem. The significance derived from findings that antisocial behaviour (particularly aggressive acts) are relatively prevalent among community samples, serve as the basis for one-third to one-half of clinical referrals among children, are relatively stable over the course of development, often portend major dysfunction in adulthood (e.g., criminal behaviour, alcoholism, antisocial personality), and are likely to be transmitted to one's offspring's (Kazdin, in Press; Loeber 1985; Robins, 1981; Rutter & Giller, 1983).

Adolescent aggression is an important focus for educators and parents owing to its relative stability over time and consistent link to a variety of negative outcomes later in adolescence, including delinquency, substance use, conduct problems, poor adjustment, and academic difficulties (poor grades, suspension, expulsion, and dropping out of school). In addition, verbal and physical aggression often is the first signs, as well as later defining symptoms, of several childhood psychiatric disorders. These include Oppositional Defiant Disorder and Conduct Disorder, both of which have prevalence rates ranging from 6 to 10% in the general population and even higher among males, according to the American Psychiatric Association.

Aggression is defined as "a sequence of behaviour, the goal response of which is the injury to the person toward whom it is directed" (Dollard et al., 1939).

Although the term aggression refers to a wide spectrum of behaviours, in the psychological literature, it is defined as any behaviour intended to harm another individual who is motivated to avoid being harmed (e.g. Baron & Richardson, 1994; Coie & Dodge, 2000).

Aggressive behaviours can vary from problems with emotional regulation to severe and manipulative behaviours. There are various characteristics of aggression, which can include behaviours such as starting rumours; excluding others; arguing; bullying, both verbally (name-calling) and physically (pushing); threatening; striking back in anger; use of strong-arm tactics (to get something they want); and engaging in physical fights. Notably, aggressive behaviours do not always involve physical contact with another person. Verbal aggression in elementary school years, such as starting rumors, excluding others, and arguing, can be part of a developmental trajectory leading to adolescent delinquency and Conduct Disorder.

Adolescents with a childhood onset of aggression, rather than an adolescent onset, are more likely to display the most persistent, severe, and violent antisocial behaviour. Indeed, childhood aggression is often viewed as an indication of a broader syndrome, frequently involving oppositional and defiant behaviour toward adults and covert rule-breaking behaviours. These behaviours could lead to more serious and recurrent violations in adolescence, such as stealing, vandalism, assault, and substance abuse. The development of adolescent aggressive behaviour is often considered to be the result of a set of family and personal factors, with the child's aggressive behaviour representing a substantial part of that developmental pattern. For example, children with difficult temperaments and early behavioural problems are at greater risk for later adolescent aggression and conduct problems. This developmental course is also set within the child's social environment. For example, poor parenting practices, such as poor parental monitoring and supervision and high rates of harsh and inconsistent discipline, have been shown to contribute to children's aggressive behaviour.

In early to middle childhood, children who show high levels of oppositional behaviour and aggression may experience negative reactions from teachers and peers. This may also lead to problematic ways of processing social information, such as relying on aggressive solutions in problem solving when presented

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with social conflicts, expecting that aggressive solutions will work, and having difficulties interpreting social information accurately (such as attributing neutral behaviours by others as hostile). Aggressive children are at risk for many academic problems and, as their academic progress and social bond to school weakens (owing to problematic exchanges with teachers and peers), they become more vulnerable to influences from deviant peer groups.

By adolescence, this developmental course results in a heightened risk of substance use, delinquent acts, and school failure. Likewise, certain environmental risk factors can play a role in moving an adolescent along this developmental pathway. For example, family dysfunction may be sufficient to initiate the sequence of escalating aggressive behaviour. Living in poor, crime-ridden neighbourhoods also adds to the environmental risk factors leading to seriously aggressive, problematic behaviour.

For young children to outgrow their aggressive ways, they need positive, consistent, nurturing discipline. They need to learn positive problem-solving techniques. Parents and teachers need to place children in environments that offer a setting and support for learning positive social behaviour rather than aggressive, hostile, antisocial acts. Social behaviour is behaviour directed towards society, or taking place between, members of the same species. Positive social behaviour means conforming to the social norms or expectations which do not include problem behaviour.

Therefore, besides knowing the etiological factors or the risk factors that foster aggression, it is also important to know and understand the protective factors that are associated with less aggression. Several treatments have been implemented to alter antisocial behaviours including diverse forms of individual and group therapy, residential treatment, pharmacotherapy, and a variety of community based treatments (Kazdin, 1985).

As the medical treatment has many side effects. Medicines make the individual more addicted to it and their effect is not long lasting. There are more chances of relapse if one stops taking the medicine and is totally dependent on it, therefore, application of school based intervention programmes and social-cognitive group intervention programmes in the treatment of aggression has recently received wider attention.

Stirtzinger et al. (2001) examined the effects of a school based multi model intervention project to assist aggressive students at-risk for school dropout and delinquency. It is maintained that school climate, peer pairing, teacher education and whole class interventions are main clinical strategies which seek to attain a multiple reinforcement model for increased social inclusion, healthy behaviour and social interaction in the at-risk student group. In one more study on reducing children's aggressive and oppositional behaviours in the

schools, Muris et al. (2005) examined the effects of a social-cognitive group intervention program for children with oppositional and aggressive behaviours. Forty-two children aged between 9 and 12 years who clearly displayed behaviour problems at school were treated with this program.

A cross over design was used in which one group of children first received treatment and then assigned to a waiting period, whereas, the other group of children first waited and subsequently received treatment. Results demonstrate that the social cognitive intervention yielded a significant reduction of behaviour problems and an increase of social- cognitive skills as compared to the waiting list control condition. Further, a follow-up assessment of the children who were initially treated indicates that the intervention effects were retained over a three month period. Finally, some support was found for the theoretical underpinnings of the social- cognitive skills were to some extent associated with a larger reduction of behaviour problems. Interventions that seek to increase protective factors and reduce risk factors can significantly reduce aggressive behaviour in children and teens.

Techniques like yoga, relaxation and interpersonal counseling also seems to be highly influential in reducing aggression (Rana, 2007). Yoga is the word derived from the Sanskrit root "Yuj" which means to join, attach and yoke, to direct and concentrate one's attention on, to use and apply. It also means union or communion. It is the true union of our will with the will of God. Yoga is regarded as a science as well as a method that allows man to live a harmonious life with spiritual progress through the control of mind and body.

Krishna Rao (1995) discusses the significance of yoga to the well being of mankind. The core of yoga practice lies in concentration, yogic meditation and absorption. Reports showed that yogic practices are probably the most important and effective self-help tools available to humanity. Substantial reduction in depression, anxiety, psychotism, paranoid ideation, hostility, somatism, obsession, and inter-sensitivity has been found on account of living a yogic lifestyle (Bhushan, 1998).

Physical and perceptual benefits were investigated with twenty-six healthy adults, 20-58 years of age, using two different styles of yoga, Hatha and Astanga. The participants were divided into the two different yoga classes for six weeks. The significant improvement of α twenty-percent reduction in self-perceived stress for participants in Astanga yoga and no significant reduction in self-perceived stress for Hatha participants shows there are differences in perceptual benefits of yoga. Perceptual benefits were assessed using Perceived Stress Scale, and short form 20 health survey was used for data collection. This study is significant to the area of yoga research because it

focused on testing the benefits of certain styles of yoga (Cowen, & Adams, 2005). A similar study was done by Wheeler and Wilkin (2007) with 79 college students, ages 18-24, to determine if Yoga Asana influenced perceived stress and anger level over a ten-20 week period. The results of the study suggest that Yoga Asana was associated with positive pre to post-class changes on perceived stress and anger.

The present research was designed to study the effect of intervention programme on aggression. It is basically concerned with intervention technique which is used in psychotherapy to disrupt ongoing maladaptive behavior patterns. In the present study an attempt was made to reduce/manage the high aggressive behavior with the help of yoga, relaxation, and interpersonal counselling. In the intervention programme, yogic techniques, relaxation technique coupled with interpersonal counselling were administered. The hypothesis of the present investigation is, "intervention programme will be effective in monitoring aggression." The 1 month intervention was given to only high aggressive students, while the other high aggressive group remained as control.

II. DESIGN

In order to study the effect of intervention programme on aggression among students, a 2x2x (2) Repeated Measure ANOVA was computed. The first two levels were control and experimental groups; second factor i.e. gender and the last factor was a Repeated Measure in the form of pre and post test on aggression. The intervention was administered in the post test condition. The pre test scores served as attention control.

III. SAMPLE

A total of 100 students (100 males and 100 females) from various schools of Shimla (H.P.) participated in the present research work. The age ranged between 14- 17 years. Out of 200 students, 100 subjects were high on aggression (50males, 50 females). From these 100 subjects, 50 students (25 males and 25 females) were randomly selected for the intervention. The other 50 remained as the control group.

IV. TOOLS

a) *Direct and Indirect Aggression Scales by Bjorkqvist et al. (1992) (DIAS)*

Aggression was measured with "Direct and Indirect Aggression Scales," (DIAS) developed by Bjorkqvist, Lagerspetz, and Osterman (1992). The instrument consists of three subscales: physical, verbal, and indirect aggression. Indirect aggression was conceptualized as attempts to cause psychological harm to the target person by social manipulation,

pretending that the attack was not aggressive at all. Few changes were introduced in the scale. The original scale consisted of 24 specific acts of aggression. These were reduced to 23 acts and changes were made in the language. It was made easier so that all the students/subjects can easily understand what was asked. Total items included in the three subscales were as follows; physical aggression (7 items), verbal aggression (5 items) and indirect aggression (11 items). In this scale, each pupil of a class is asked to assess, on a 5-point scale, the extent to which each other pupil in the class is exhibiting any of 23 specific acts of aggression when in conflict with or angry with his/her peers.

The instrument may be applied in both peer and self-estimations. In the present investigation, same sex peer-estimated data was used i.e., females' ratings of females and males' ratings of males. The subscales of DIAS had high levels of internal consistency, ranging from .80 to .94 in the different subgroups of the study. The test retest reliability is .85 and criterion validity of this scale is .88. First, the pairs were made for peer rating. Then they were given the questionnaires. Following instructions were given to the subjects:

"Please read each and every item in the questionnaire carefully, and rate your peer under the options you feel relevant for him/her. It was made clear to the subjects that there were no right or wrong answers and there is no particular time limit but don't waste much time on any single item."

Scoring of the responses was done carefully. First, scoring for each subscale was done on 5-point scale and then the scores on all the 3 subscales were combined, to get the total score on aggression scale.

V. INTERVENTION PROGRAMME

The intervention programme included yogic exercises including relaxation techniques and interpersonal counselling. Duration for the training was six months which involved daily practice schedule. A two day workshop was conducted thrice for this purpose. Besides this, subjects were contacted individually for interpersonal counselling from time to time. The session of interpersonal counselling was of two months as each student from the experimental group was given counseling. Subjects were given individual counseling so that they could share their feelings and problems openly and freely. After a week's gap of this two months session, a two day workshop was conducted. Since, the main emphasis of the present study was on yogic therapy including relaxation and meditation, an attempt was made to extract those therapeutically significant ingredients from Patanjali's eight fold yoga system, which could be effectively applied to the treatment of aggression. Therefore, yogic techniques were demonstrated to help subjects correctly practice them.

After this, they were given three weeks break. After the break they were again given a workshop of 2-3 days on the same yogic techniques in the middle of 4th, 5th, and

6th month. Workshop of 38- 43 minutes included following techniques:

a) *Deep Breathing:*



It helps in vacating the mind from all worries, tensions, negative emotions and thoughts letting the mind relax.

Instructions: "Breathe deeply, slowly and imagine that each inhalation fills your mind, purifies it from all negative thoughts and emotions, worries and tensions. All that is good in the universe around you is entering inside your body and that you are getting filled up with divine powers. Thoughts which you want to get rid of your mind (especially related to aggression, poor concentration, and academic achievement) go out through exhalation and those desired by you are brought-in with inhalation.

b) *Kapalbhati:*

It is an excellent preparation for concentration and meditation, as it calms the mind. 'Kapal' means skull and 'Bhati' means purification, so, it is a purification and cleansing of the inside skull. Hence, kapalbhati refers to that exercise which makes the skull and brain luminous and lustrous. This technique should easily be done for five minutes.

Instructions: Sit either in any of the asanas, viz. padmasana, sidhasana, vajrasana, or any other meditative posture whichever you find convenient. Breathe in and out normally and forcefully, so as to influence the organs of the abdominal area. This technique should easily be done for five minutes. While doing this technique think that while exhaling you are throwing all the diseases out of your body. Individuals with mental aberrations like anger, greed, self-ego, attachment etc. should develop a feeling of throwing out all the negative and injurious elements along with the air exhaled. In the beginning do kapalbhati for three minutes and gradually increase it to five minutes. Initially, if you feel tired in between, take rest for a while and resume after practice of about two months, you will be able to perform this pranayama for five minutes at a stretch without any fatigue. In the beginning, you may feel a little pain in the back or abdomen. But this will disappear after some practice. So do not give up.

c) *Anulom-viloma Pranayama:*



This pranayama quiets the mind and helps in improving concentration.

Instructions: After sitting in the suitable posture, close the right side nostril with the right hand thumb. Prana breathed in through left nostril represents energy of the moon, which symbolizes peace, and has a cooling effect. Right nostril imparts heating effect on the body. Hence for purification of nadis, beginning of this pranayama has to be made by the left nostril. Inhale slowly through the left nostril till the lungs are filled. Then close the left nostril with the second and third fingers (Madhyama and Anamika). Open the right nostril and

exhale through it. Repeat this exercise slowly in the beginning, and with practice, increase the speed. When you are able to practice this exercise for a long time, inhale with as much rhythm as is possible for you, then exhale also rhythmically. This practice of inhalation and exhalation alternatively through the right and left nostril, as indicated above should be done for three minutes.

If you feel tired, rest for sometime and resume. Regular practice will enable you to do this pranayama for ten minutes. After some practice, this pranayama

should be done for five to ten minutes daily, depending upon one's capacity. However, in summer season it should be done for duration starting from three minutes and up to a maximum of five minutes. If you practice this Pranayama for five minutes regularly on a daily basis, the coiled energy called kundalini shakti lying in the muladhara chakra begins to awaken. This is known as kundalini jagran. While doing this pranayama, mentally repeat the mantra "OM" so the mind becomes fit for meditation.

While performing this pranayama there develops a feeling in mind that the whole body is being enlightened by a divine light. Imagine that the supreme power is showering divine energy and divine knowledge,

that the supreme power is filling you with divine power and virtues. Try to get the initiation of the divine energy by yourself anulom-viloma pranayama done with this kind of feeling gives better results and benefits to the individual in all the spheres viz. physically mentally and spiritually. A divine power light will appear from the muladhara-chakra on its own and there will be kundalini jagran, you will feel the kick/rise within yourself and you will be blessed with the initiation of the divine energy in yourself. Regular practice of this pranayama also has the capacity to replace negative thinking by positive approach to life. It increases enthusiasm and spirit, the person becomes fearless and feels blissful.

d) Bhramari Pranayama :

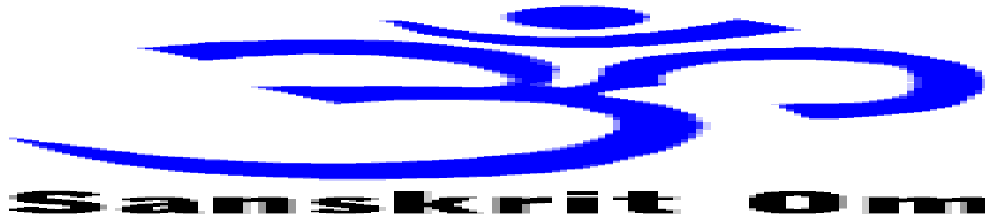


Traditionally it is believed to induce ecstasy (Hewitt, 1983). It involves deep and slow diaphragmatic breathing.

Instructions – Breathe in till your lungs are full of air. Close your ears with both the thumbs and eyes with the middle fingers of your hands on respective sides with little pressure. Press forehead with both the index fingers lightly. Close both the eyes. Then press eyes and nose bridge from the sides with the remaining fingers. Concentrate your mind on Ajna chakra (between eyebrows). Close your mouth. Begin slowly exhaling, making humming sound of a bee, while reciting "OM" mentally. Do it for 2 minutes.

This pranayama should be done with the thought that individual consciousness merges with the divine cosmic consciousness. Mind should be full of the thought that divine bliss is descending, that deep divine wisdom fills the entire being. Exercising this pranayama with such thought will endow one with divine light and one will be able to meditate effortlessly. With the practice of this pranayama the mind becomes steady. It is beneficial in conditions like mental tension, agitation, high blood pressure, heart disease etc. It is also useful for meditation.

e) Oral "OM" Chanting:



During this stage subject chants "OM" verbally with a single flow of voice and concentrates on the sound until it fades into silence (Delmonte, 1984). The very nature of chanting ensures deep breathing and relaxation. Active chanting leaves one's body and mind vibrant and cures throat problems and massages throat muscles (Shambhunath, 1992). The sounding of "OM" gives a vibro-message to various glands and vital organs in the thoracic cavity and the abdomen, stimulates deeper breathing, tones the nervous system (Hewitt, 1983).

Instructions: "Breathe in deeply, and then rounding the mouth chant "OM" during exhalation. Do not try to suppress the sound, but let it flow smoothly like water flowing. The pattern of chanting should be like this: two-third of the exhalation time try to chant with mouth open (i.e. 'Oh...') and the remaining one-third, chant with mouth shut (i.e., 'mm.....') concentrate on the resonance of the sound and the vibration caused within your body and head."

f) *Meditation:*

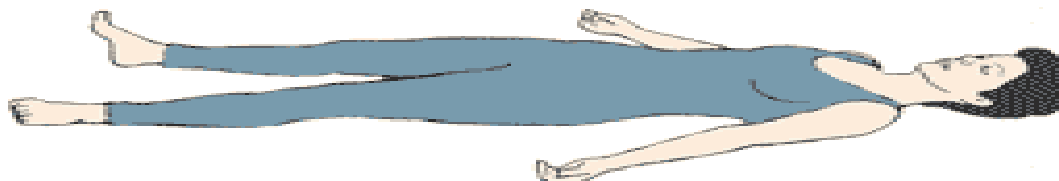
It involves a group of techniques, which have in common a conscious attempt to focus attention in an

analytical way and attempt not to dwell on discursive, ruminating thought.



Instructions were given for meditation. "Concentrate your mind on the respiration and meditate on the sacred mantra "OM" with every act of breathing in and breathing out mentally go on repeating the mantra "OM". The speed of respiration should be so slow and subtle that you yourself also may not be aware of its sound, even if a piece of cotton is placed in front of the nostril. It should not move by the effect of the air exhaled out. Slowly practice and make the duration of one inhalation and exhalation to one minute. Likewise, try to

visualize the breath inside the body. Initially the breath can be felt only in the nostrils but gradually it will be felt deep inside. In this way, visualizing the breath and continuous chanting of "OM" will lead to dhyana automatically. Your mind will develop a feeling of concentration and your body will be filled with the feeling of "OM". The Gayatri Mantra from the Vedas can also be chanted meaningfully along with pranayama. Also, if this is practiced at bedtime, one will get peaceful sleep without any perverted dreams etc.

g) *Shavasana:***Savasana**

It is also called yoga relaxation in western texts. Its effectiveness in enhancing autonomic balance, physical relaxation and tranquility of mind has been well documented (Brownstein and Dembert, 1989; Lasaster, 1998; Patel et al., 1985).

Instructions: Lie flat on the back place the hands a little away from the thighs with the palms up lean the head to the side. Keep the eyes closed and legs a foot apart. Now breathe very slowly. Relax each part and each muscle of the body. Try to make the mind as blank as you can. Consciously try to become unconscious. Now observe your breathing and move to the experience of spiritual awareness. Besides the yogic techniques, a relaxation technique by Jacobson was also taught to the experimental group.

h) *Progressive Muscular Relaxation (PMR):*

It was developed by Jacobson (1938) and is a widely used procedure today. It causes deep muscular relaxation in muscle groups, tensed under stressful conditions. In progressive muscular relaxation, first you deliberately tense the muscles, and then you let go, and turn your attention to how the muscles relax as the

tension flows away. The aim is to work systematically through the body and it is usual to start with the hands, work up to the shoulders, then back to the feet and up to the shoulders again, leaning the face and neck to last.

Instructions: Here is an order in which the subjects were instructed to do the following:

Hands : Raise your hands and make a fist really hard. Hold the fist tight and you see how your muscles in your hands and arms feel when they are tight. Do it for 7-10 sec. Now relax and drop your hands and arms to your side (15 sec.).

Shoulders : Raise your shoulders as if they could touch your ears hold it for 7-10 sec. Now relax for 15 sec.

Feet: Screw up your toes. Hold it for 7-10 sec. Then relax for 15 sec.

Front of Legs : Point your foot away from you so that it is almost parallel with your leg. Hold it for 7-10 sec. Now relax for 15 sec.

Back of Legs : Flex your feet upwards, stretching your heels down. Do it for 7-10 sec. and then again relax for 15 sec.

Thighs : Tighten them while pressing your knees down into the floor. (7-10 sec). Relax (15 sec.).
Bottom : Clench your buttocks together (7-10 sec). Relax (15 sec).
Stomach : Hold your stomach muscles in tight (7-10 sec). Relax (15 sec).
Chest : Breath in, hold your breath, and tighten all your chest muscles (7-10 sec). Relax (15 sec).
Shoulders : Breath in, hold your breath and raise your shoulders as if to touch your ears (7-10 sec). Relax (15 sec).
Neck : Stretch your head up, as if your chin could touch the ceiling (7-10 sec). Relax (15 sec).
 Bend your head forward until your chin reaches your chest (7-10 sec). Relax (15 sec).
Mouth and Jaw : Press your lips together and clench your teeth (7-10 sec). Relax (15 sec).
Eyes: Close them tightly (7-10 sec). Relax (15 sec).
Forehead and Scalp: Raise your eyebrows as if they could disappear (7-10 sec). Relax (15 sec).
Face : Screw all the muscles up together (7-10 sec). Relax (15 sec).

VI. INSTRUCTIONS

Following instructions were given to the students before the training/intervention session:

Select a clean, ventilated and peaceful place for doing yogic techniques and relaxation.

Sit either in any of the asanas, viz. padmasana, sidhasana or vajrasana which ever you find convenient. The sheet or cloth (cotton or wool etc.) on which you sit must be a non-conductor of electricity.

Breathe only through the nose, because by doing so the air which you take in is filtered. During day time even make it a habit to respire only through nose and not through mouth.

Yogic techniques especially pranayama should be performed four or five hours after taking food. In the

morning it should be done after finishing daily routine acts like cleansing mouth, emptying of bowels etc. In the beginning it should be done for five or ten minutes. Gradually the time may be increased up to about ½ or 1 hour. Maintain a specific number of repetitions and do not change

Keep your mind calm and composed. However, yoga and relaxation techniques can also calm down the disturbed mind and keep one peaceful.

If you feel fatigued in the course of doing yogic techniques, take rest for sometime and then begin deep breathing, which will remove the fatigue.

Avoid food containing irritating spices. Eat plain and simple, non-spicy food. Use of cow's milk, ghee (clarified butter), fruits and green vegetables can be said to be an ideal food.

Few techniques in it (Pranayama) does not mean just breathing in, keeping the breathed air in and exhaling it. It also means establishing control on the entire breathing process, and maintaining mental equilibrium, and concentration of mind.

Be careful that while doing these yogic techniques, none of your organs such as mouth, eyes, nose, etc. feels any strain and it should be done gradually without any undue stress or strain. All the organs of the body should be kept in normal condition.

While doing them (especially pranayama) sit in an erect posture. Keep your spine and neck straight. This is essential for reaping the full benefit of these techniques.

VII. RESULTS

a) Physical Aggression

Table 2 states that the F-ratio for the main effect of group under error (A) is 22.84**, $p < .01$. It shows the significant differences in the mean value of control and the experimental group. Mean for control group is 21.19 while it is 16.46 for experimental group (Table 1).

Table 1 : Grand Mean of Group, Gender and Treatment in Physical Aggression

Variable	Males	Females	Control	Experimental	Pre treatment	Post treatment
Physical Aggression	20.85	14.75	21.19	16.46	21.19	16.46

The F-ratio for the main effect of gender under error (A) is 64.25**, $p < .01$. Grand mean of males' physical aggression is 20.85 and that of females' is 14.75 which reveal that there is significant difference in the physical aggression of males and females (Table 1).

The main effect of treatment under error (B) represents significant treatment effect, F-ratio being 27.78** $p < .01$ (Table 2).

Table 2 : Summary of Rpmanova on Physical Aggression

Source of Variance	Sum of Squares	df	MSV	F-ratio
Error A Between Groups				
Group	339.45	1	339.45	22.84**
Gender	954.88	1	954.88	64.25**
Group x Gender	16.20	1	16.20	1.09
Error (A)	1427.46	96	1427.46	
Error B within Groups				
Treatment	129.50	1	229.50	27.78**
Treatment x Group	507.75	1	507.75	61.47**
Treatment x Gender	51.53	1	51.53	6.20*
Treatment x Gender x Group	5.00	1	5.00	.61
Error (B)	729.71	96	8.26	
Total	4224.48	199		

* p < .05; ** p < .01

With regard to the two factor interaction i.e. treatment x group, F-ratio is 61.47** which is significant at .01 level. Pre and post means for the experimental

groups are 10.70 vs. 5.76, while pre and post means for control group are 10.49 vs. 10.70 (Table 3).

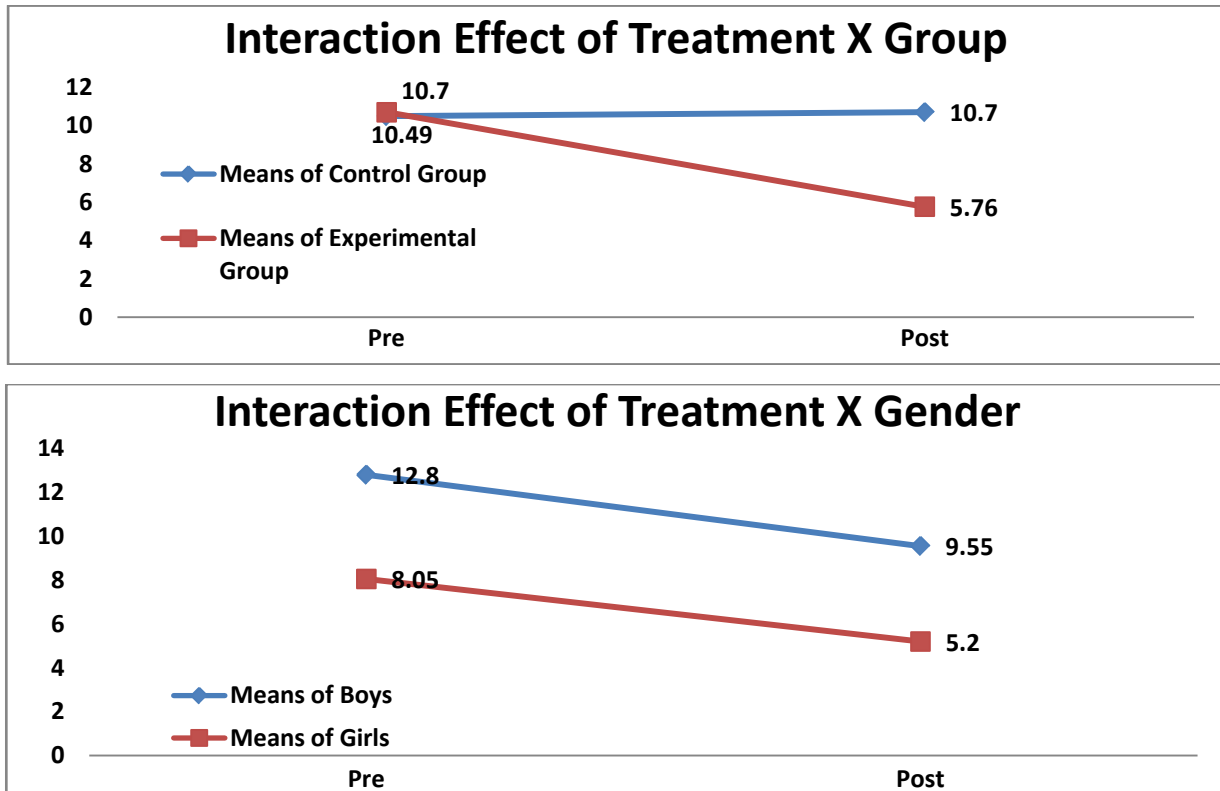
Table 3 : Mean Contingency Table of Physical Aggression

Treatment	Means of Treatment x Group		Means of Treatment x Gender	
	Control	Experimental	Males	Females
Pre	10.49	12.80	12.80	9.55
Post	10.70	5.76	8.05	5.20

The interaction effect clearly depicts that there is a perceptible crossover in the physical aggression of the control vs. experimental group (Fig. 1). The F-ratio for the treatment x gender is 6.20* which is also significant at

.05 level. The means of males and females under pre treatment condition are 12.80 vs. 9.55 while under post treatment condition it is reduced to 8.05 vs. 5.20 (Table 3).

Figure 3 : Interaction Effect of Treatment X Group and Treatment X Gender



b) Verbal Aggression

It is evident from Table 5 that the main effect of group under error (A) is 5.31*, $p < .05$ showing the significant differences in the means of control and experimental group. Means for control group is 18.00 and for experimental group it is 14.32.

Regarding the main effect of gender under error (A) F-ratio is 6.69*, $p < .05$ which represents the significant gender differences. Overall means of males and females are 18.15 vs. 15.34 (Table 4). It is visible from the means table that the overall verbal aggression of females is significantly lower than the males.

Table 4 : Grand Mean of Group, Gender and Treatment in Verbal Aggression

Variable	Males	Females	Control	Experimental	Pre treatment	Post treatment
Verbal Aggression	18.15	15.34	18.00	14.32	18.00	14.32

Under error (B), the main effect of treatment is significant at .01 level, F-ratio being 10.88**. It reflects the significant effect of treatment.

The two factor interaction i.e. treatment x group is also significant at .01 level, F-ratio being 65.66** (Table 5).

Table 5 : Summary of Rpmnova on Verbal Aggression

Source of Variance	Sum of Squares	df	MSV	F-ratio
Error A Between Groups				
Group	127.81	1	127.81	5.31*
Gender	161.11	1	161.11	6.69*
Group x Gender	34.20	1	34.20	1.42
Error (A)	2309.07	96	24.05	
Error B Within Groups				
Treatment	66.05	1	66.05	10.88**
Treatment x Group	398.61	1	398.61	65.66**
Treatment x Gender	4.61	1	4.61	.75
Treatment x Gender x Group	.70	1	.70	.12
Error (B)	582.92	96	6.07	
Total	3685.08	199		

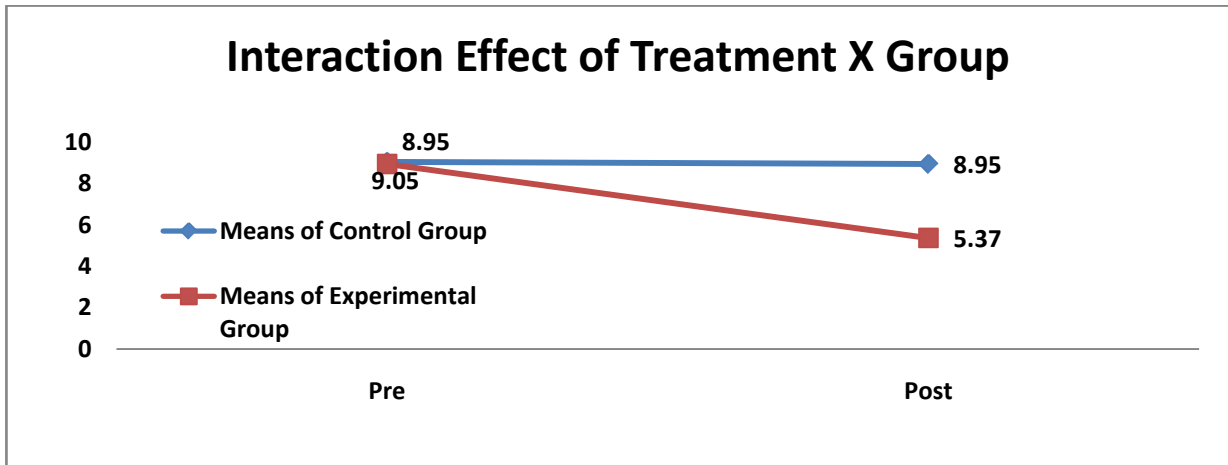
Through contingency table the pre and post means can be compared i.e. pre and post means of

experimental group are 8.95 vs. 5.37, while that of control group are 9.05 vs. 8.95 (Table 6).

Table 6 : Mean Contingency Table of Verbal Aggression

Treatment	Means of Treatment x Group	
	Control	Experimental
Pre	9.05	8.95
Post	8.95	5.37

Figure 4 : Interaction Effects of Experimental Group and Control Group in Verbal Aggression



c) *Indirect Aggression*

As far as indirect aggression is concerned, the main effect of group under error (A) is significant at .01 level, F-ratio being 18.05** showing the significant differences between the groups (Table 8). Means for control and experimental group are 38.14 vs. 30.15 (Table7).

The F-ratio for the main effect of gender under error (A) is 3.55* which is significant at .05 level. Overall means of males' in indirect aggression are 38.03 and that of females is 34.07, indicating that the level of indirect aggression among males is significantly higher than females (Table 7).

Table 7 : Grand Mean of Group, Gender and Treatment in Indirect Aggression

Variable	Males	Females	Control	Experimental	Pre treatment	Post treatment
Indirect Aggression	38.03	34.07	38.14	30.15	38.14	30.15

For the main effect of treatment under error (B), the F-ratio is 5.70*, p < .05 showing significant treatment effect (Table 8).

Table 8 : Summary of RpmANOVA on Indirect Aggression

Source of Variance	Sum of Squares	df	MSV	F-ratio
Error A Between Groups				
Group	1508.15	1	1508.15	18.05**
Gender	296.51	1	296.51	3.55*
Group x Gender	15.88	1	15.88	.19
Error (A)	8016.97	96	83.51	
Error B within Groups				
Treatment	512.72	1	512.72	5.70*
Treatment x Group	1625.12	1	1625.12	18.08**
Treatment x Gender	44.54	1	44.54	.49
Treatment x Gender x Group	29.25	1	29.25	.32
Error (B)	8625.60	96	89.95	
Total	20674.74	199		

* p < .05; ** p < .01

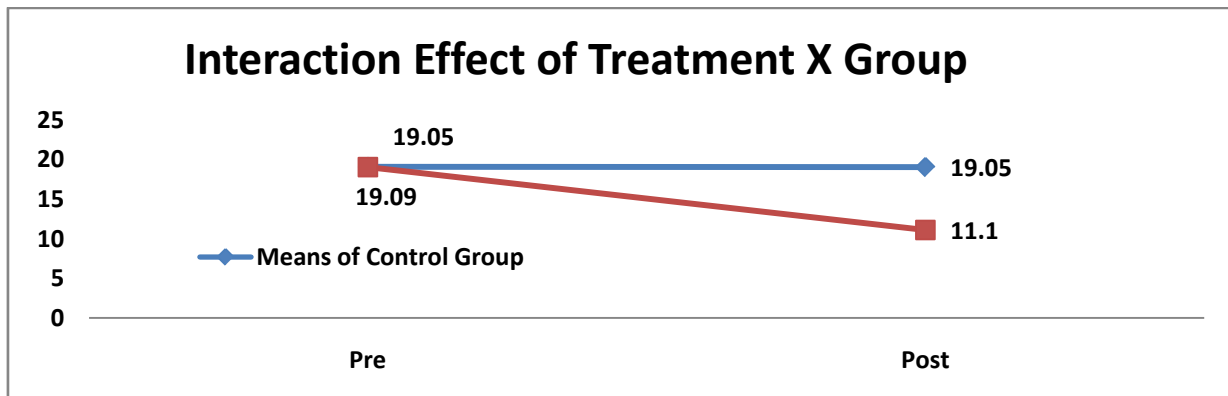
The two factor interaction of treatment x group is significant at .01 level, F-ratio being 18.08**. In the Mean contingency (Table 9) the experimental groups' mean for pre intervention is 19.05 and post intervention

is 11.10. Pre and post means for control group are 19.09 and 19.05. The interaction table and figure shows a perceptible crossover in the indirect aggression of experimental and control group (Fig. 4 & Table 9)

Table 9 : Means Contingency Table for Indirect Aggression

Treatment	Means of Treatment x Group	
	Control	Experimental
Pre	19.09	19.05
Post	19.05	11.10

Figure 4 : Interaction Effect of Treatment X Group on Indirect Aggression



VIII. DISCUSSION

Aggressive behaviour can readily be observed in social interactions of children with peers, parents and authority. Either the child has not learnt the better ways of responding to environmental forces or his needs for aggression are so strong that he cannot behave otherwise. The control of aggressive behaviour is very important so that the child can learn to check his rage, discriminate between appropriate and inappropriate situations to behave aggressively and in other words, to modulate/vary his aggressive response to match the degree of provocation to which he may be subjected. Aggression is not unmanageable. With the help of various techniques one can overcome aggression. Just a zeal, enthusiasm and determination to manage it should be there within the individual. Therefore, the emphasis should be on the need for more sensitive measures of at-risk children's psychological and academic changes. Keeping in mind all the facts and problems related to aggressive behaviour an intervention programme was introduced in the present investigation.

In the second section of the study, a 2x2x (2) Repeated Measure Analysis of Variance was employed. High aggressive subjects were divided into two groups i.e. Control group (n = 50) and Experimental group (n = 50), 25 males and 25 females in each group. Both the groups were assessed on the variables of aggression, before and after the intervention. In the pre test condition, the control and experimental groups were roughly equal on aggression.

It is evident from Table 2, 5 & 8 that the F-ratios for the main effect of groups under error (A) for physical aggression is 22.84**, $p < .01$; for verbal aggression 5.31*, $p < .05$ and regarding indirect aggression, the F-ratio is 18.05**, $p < .01$. It clearly shows the significant differences in the means of control and experimental group. The difference in the groups seems to be the result of intervention programme.

As far as interaction effect i.e., treatment x group is concerned, F-ratios for physical aggression is 61.47**, $p < .01$; 65.66**, $p < .01$ for verbal aggression and for indirect aggression, the interaction effect of treatment x group is 18.08**, $p < .01$ (see Table 2, 5 & 8).

It is perceptible from the results that the experimental group has been significantly benefited from the intervention programme due to which their aggression has reduced to a significant level in all the three types of aggression. Whereas, for the interaction effect between treatment x gender, the F-ratio has been turned out to be significant 6.20* $p < .05$ only for physical aggression which shows that the inter-differences between genders are significant at both the ends that is, at the pre-test and post test session owing to treatment and the females have been benefitted more

because of their serious disposition and articulation (Sharma & Malhotra, 2007).

Thus, our hypothesis that "intervention programme will be effective in managing aggression" stands confirmed.

For the intervention programme, following techniques were used in the training phase:

a) *Yogic Techniques*

In the present study, deep breathing, kapalbhati, anulom-vilom, bhramari, oral "OM" chanting, meditation and shavasana were taken as yogic techniques in the intervention programme.

b) *Relaxation Technique (Jacobsons)*

A relaxation technique developed by Jacobson was also administered to the experimental group.

c) *Interpersonal Counselling*

Interpersonal counselling was given to the high aggressive subjects of experimental group so that they can express their feelings and problems openly and frankly. Thus, after establishing rapport, subjects were asked to perform the above mentioned techniques regularly. Beside this, they were provided with some tips for encouraging positive behaviour. During the intervention programme the subjects were visited individually and regularly to monitor their practice. Attempt was made to help such students with the help of yogic techniques, relaxation and interpersonal counselling. Interventions that seek to increase protective factors and reduce risk factors can significantly decrease aggressive behavior in children and teens.

Here the main question is how the practices of yoga, relaxation and interpersonal counselling to reform the aggressive children can be utilized? The parent, and the challenges of life cannot be replaced but the child can be taught these techniques and resolve their personal conflicts. The results of the present investigation support this viewpoint. At the end of the intervention programme, changes in aggressive behaviour between pre test and post test were analyzed. It was detected that the experimental group improved significantly in terms of aggression i.e. it was reduced to a significant level.

Pranayama helps in the more oxygen absorption and better carbon dioxide removal by getting most of the energy from air. Cleansing of the respiratory system is the basic task of Pranayama. Pranayama is a Sanskrit word meaning "restraint of the prana or breath". The word is composed of two Sanskrit words, Prāna, life force, or vital energy, particularly, the breath, and "āyama", to suspend or restrain. It is often translated as control of the life force (prana) (Sivananda, 1971). Prana or the life energy contains all the powers of the world. It is the biggest medicine. Pranayama purifies the life energy. Generally, the main reason for any mental or

any physical problem is the negative thinking and deficiency of oxygen.

Pranayama only works as a solution for all such problems. Aggression is also among such problems and pranayama can help in managing it. Medicine can control diseases for a limited time but the actual cure can be done only with pranayama. Oxygen is that life energy, which is vital for the life. Its deficiency can be fatal. Life is the game of breathes and the life remains balanced with the balance of breathes. A person who understands this synchronization of breathes leads to healthy and disease free life. And the main purpose behind the present research was to help the students managing their aggressive behaviour through these techniques of pranayama.

While doing kapalbhati pranayama the subject is asked to think that while exhaling you are throwing all the diseases out of your body. Individuals with mental aberrations like anger, greed, self-ego attachment, aggression etc. should develop a feeling of throwing out all the negative and injurious elements along with the air exhaled. In this way the feeling of getting rid of diseases while exhaling imparts a special benefit to the individual.

Regular practice of anulom vilom has the capacity of cleansing all innumerable nadis, which makes the body healthy lustrous and strong. Alternate nostril breathing, balances nadis and nervous system, and teaches the person how to induce calmness within him. Negative thinking is replaced by positive approach to life. It increases enthusiasm and the spirit, the sadhak becomes fearless and feels blissful. In short, this pranayama has the effect of cleansing the body and the mind and cures almost all the diseases from which the individuals has been suffering. If this pranayama is practiced for 250 to 500 times a day. Kundalini shakti turns its face upward and begin to rise above through the susumna nadi. It means that the phenomenon known as kundalini jagran begins.

Exercising bhramari pranayama with the thought that your individual consciousness merges with the divine cosmic consciousness, endows you with divine light and helps in meditating effortlessly. With the practice of this pranayama the mind becomes steady. It is beneficial in conditions like mental tension, agitation, etc. The very nature of chanting 'OM' ensures deep breathing and relaxation. Active chanting leaves one's body and mind vibrant. Mind develops a feeling of concentration and peacefulness.

Children are as good as or better able than adults to learn relaxation therapies (Hiebert et al., 1989; Zaichkowsky & Zaichkowsky, 1984). Children seem more enthusiastic about such procedures than adults. Relaxation therapy can also be a positive addition to improving psychosomatic disorders (Richter, 1984) and hyperactive children's impulsivity, disruptive behaviour, academic performance and self-concept (Omizo & Williams, 1982).

Ahmad et al. (1988) has also reported that meditators show overall better adjustment and personality organization than non-meditators. Yoga is claimed to endow perfect physical, mental and social well being of an individual. A different set of studies by Muskatel et al. (1984) and Hafner (1982) show that meditation practice can be effective in reducing hostile behaviours. Similarly, relaxation therapy, such as progressive muscular relaxation (PMR) and meditation seems to be equally effective as cognitive therapy in reducing symptoms of hostility (Deffenbacher, et al., 1990).

On a subjective level, regular practice of yoga promotes strength, endurance and flexibility and cultivates a sense of calmness and well being. Yoga students normally report an improved sense of energy to lead life fully with enjoyment (Mehta et al., 1995), which is the opposite of fight/flight stress response. In this regard, Collins (1998) suggested that regular practice of yoga leads to overall physical and psychological well being. The very aim of yoga is the harmonic integration of the body, mind and spirit in search of perfect health, self awareness and spiritual attainment.

Yoga and meditation can contribute positively to various cognitive processes including perception and in turn, on subjective well-being, quality of life and criminal propensity (Khurana & Dhar, 2000). A study by Ghosh (2003) revealed that recitation of "OM" usually gives rise to sensations, feelings and experience of positive nature improves the cognitive functioning such as attention, concentration, perception etc. In the same way individual-oriented intervention seems to be more effective than group-oriented programme. George et al. (1998) administered cognitive behavioural intervention to a single patient. The fact that the intervention was focused on a single individual implies greater motivational force of the intervention.

In the present study, yogic exercises were administered, where each individual from high aggressive group (experimental group) was contacted individually. In such situations, intensive individual-focused attention and consequent motivational force was much more. Therefore, subjects from experimental group benefited more as compared to the control group.

IX. LIMITATIONS

The present study was an attempt to investigate the effect of intervention programme on aggression. As no research work is without any limitations, therefore, we turn now to discuss some limitations of the present study. First, separate effect of intervention techniques should have been observed rather than the combined effect in order to determine the individual/separate contribution of these techniques (Yoga, relaxation and

interpersonal counselling). Therefore, the future researches should take note of this. Another concern is that the samples used were from Himachal Pradesh (INDIA), limiting our ability to generalize the findings. Nonetheless, the present findings are highly significant, hence, can be generalized and can act as a guide for further research in the field of human aggression. The fact that the participants were taken from a particular area of India and moreover in India sex differences appear to be greater in aggression in comparison with those in the west. Therefore, the results were scored according to gender. Moreover, the differences in cultural norms and status between the sexes cannot be ignored. During interpersonal counselling subjects were told about the benefits of yoga, demerits of aggressive behaviour and were provided with few tips with the help of which they can manage their aggressive behaviour and increase their concentration level and academic achievement. Their personal or familial problems were also discussed, which they feel was responsible in aggravating their aggressive behaviour. With the help of interpersonal counselling it is easy to instil a higher self-concept and an attitude of inner discipline, as here we deal with the subjects individually and the subjects also feel free in sharing their personal problems. Another possible study might include a larger number of participants. Another possibility might include more different schools with similar demographics that might show different results. Future research could also include different age groups of children. There is minimal research on yoga with younger children. Younger children may show aggression differently and may not have developed coping skills for aggression. Older children, such as middle school students, may also perceive aggression differently. Comparing the effectiveness of yoga for a broad age range of children would be an interesting study.

X. CONCLUSION

In dealing with aggressive adolescents, one must remember that they are generally not receptive, cooperative or obedient, and a person attempting to teach them yoga practices may become easily frustrated when confronted by a negative, resentful child. Yoga cannot be forced on anyone; it is up to the counsellor to devise ways of introducing these techniques so that they appeal to the child. If an adolescent can experience even a brief period of mental relaxation, he/she will gain some insight into his own behaviour. In such cases interpersonal counselling plays a very important role and the results of the study confirm this viewpoint. Hence, a complete package of yogic techniques, relaxation technique and interpersonal counselling procedures are highly efficacious in managing aggression as the failure of one technique can be taken by the other. These techniques

help in alleviating aggression and bring out better concentration level, academic achievement and the best in the individual.

In a nutshell, it can be said that yoga alone offers a relaxed outlook in life. A rested mind and a rested body are the best kind of health insurance. It is from the rested mind that the entire beneficial cycle starts. In psychoanalytical language yoga helps us to conquer the neurotic personality of our times and makes the mind peaceful and happy. Chanting of OM stimulates the brain cells resulting in their reactivation and ultimately leading to better concentration (Ghosh, S.K. 2003). It is rightly said – “If you wish to change the society, first change yourself and through yoga man can find his zest for life”. Yoga bestows on man healthier and happier life. Yogasanas give suppleness to the spine tree of our life by calming the tired nerves, relaxing the muscles, revitalizing the organs and nervous system thereby increasing the power of concentration and ultimately leading to achievement in any sphere.

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Street Trading Activities and Maternal Health in Urban Areas of Nigeria

AMOO Emmanuel O ^α, Ola-David Oluwayomi ^σ, Ogunrinola I.O ^ρ & Fadayomi, T.O ^ω

Abstract - The study assessed the health risks associated with street trading activities among selected mothers in urban centers of Nigeria. The data used was extracted from national survey data among 3,873 street traders selected in various Central Business Districts (CBDs) across three major cities of Nigeria, namely, Lagos, Kano and Port Harcourt. The study showed that street trading has provided job opportunities for mothers but the impact of the business on their welfare is not visible considering their weekly income that is far below their weekly expenditure. Respondents with primary, secondary and tertiary education are 0.879, 0.553 and 0.818 less likely to be injured while trading on the street compared to individuals who have no formal education. The authors suggest due recognition to be given to the activity and that street traders-government partnership be established in order to safeguard the health of the operators.

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I. INTRODUCTION

Generally, both women and men are found concentrated in certain occupation, face similar conditions at work and experience the same workplace hazards. In sub-Saharan Africa region, working women are also traditionally responsible for the household chores. However, both sexes are physically different and women are more sensitive considering their reproductive roles. It is therefore expedient to recognise these differences and examine critically the exposure of women to workplace hazards in order to enhance reduction in maternal mortality and morbidity that are rampant among the developing nations.

Deaths, accidents and infections from the workplace have been contributing immensely to the global mortality rate. Annual death toll from unsafe occupation reported for 2006 was 1.1 million people. The recorded cases of fatalities in the workplace that led to complete disability was about 300,000 out of 250 million while over 160 million people were victims of work-related diseases (ILO, 2006; WHO, 2006; ILO, 2008; WHO, 2010). Gender variations are difficult to specify especially for a low-income economy. The global figures for 2008 show that out of 337 million occupational accidents, 358,000 were confirmed as fatal, while deaths from occupational related illnesses

were 651,000 (WHO, 2010; ILO, 2006; ILO, 2008; Lu, 2011). Observation from these data show that there is a 77 percent increase in death toll from unsafe workplace between 2006 and 2008, 35 percent increase between the same period while the number of fatal accident increased by 19 percent.

Women make up 45% of the employed population in the EU (European Agency for Safety and Health at Work, 2012), they constitute about 31.2 percent of Nigeria labour force (Eweama, 2009; National Bureau of Statistics (NBS), 2010). Across the Eastern, Middle, Western and Southern Africa regions, about 37, 25, 22 and 2 percents of girls respectively in age between 10 and 14 were economically active in the year 1990 (ILO, 1990; Bledsoe & Cohen, 1993). The proportion in the next older age (15-19 years) was 62, 39, 45 and 29 percent respectively in the same year (ILO, 1990; Bledsoe & Cohen, 1993). In Nigeria, the proportion of women in labour force is unfavourably compared to the men. A change in this paradigm as currently been driven by gender equality agenda (including equal employment opportunities and support for women enterprises that were enshrined in MDG 3 (UN, 2003; NPC & USAID, 2004; Oyekanmi, 2008; Commission on Legal Empowerment of the Poor, 2008) can only be successfully achieved with the provision of safe working environment for women. The concentration of women in micro-enterprises with diverse methods of operations makes it more important to address the gender dimension in health and safety at workplace. Healthy and safe work environments can enhance, and are synonymous with quality jobs and output (Muir, 1974; Alli, 2001). It is envisaged that quality outputs would impact on women's earnings and might keep them in employment. Thus, attention must be paid to the health and safety of the jobs that women do.

However, men and women are not the same neither is their jobs and the working conditions they are exposed to the same. Likewise, the way they are treated in the society also differ. These factors can affect the hazards they face at work and the approach that needs to be taken to assess and control them. Women are always at the receiving end of most social and economic hazards (National Population Commission and USAID, 2004) and street trading is not an exception. While studies have shown some interrelationships between unemployment, earnings and poverty and economic growth, the impact of work conditions on the

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most vulnerable gender in terms of their reproductive well-being has not been conspicuous in the literature (Kwankye, Nyarko. & Tago, 2007; Beavon, 1990; Callaghan & Venter, 2011; Lantana, 2010, Motala, 2002, NBS, 2011; Walker & Gilbert, 2002).

In general, women's health is not only in terms of the well-being in female anatomy, it is a constellation of medical situations, their susceptibilities and responses to treatment for sicknesses and diseases (WHO, 2006). It also includes those bio-demographic problems which they face directly or indirectly in their day-to-day activities (Walker & Gilbert, 2002; WHO, 2006). While the medical dimension concerns with sensitive areas especially female genitalia, breasts, pregnancy and child birth, the social dimension encompasses physical fitness, mental and social well-being (WHO, 2006). Also, while most medical challenges are addressed in the health centers, the social aspects would require interdisciplinary approaches like epidemiology, biostatistics, environmental and community health, behavioral and occupational health synthesis (Public Health Agency of Canada, 2005). In this context, the social aspects of women are considered as they relate to the health risks inherent in their day-to-day trading activities especially on the street.

II. OBJECTIVES OF THE STUDY

The thrust of this study is to assess women in street trading business in urban centres of Nigeria and the implications of the job on their health. It is specifically meant to share information on the interrelationships between women's health and associated street trading risks. Also, the study examines the association between the incidence of injury experience by street hawkers, harassment and traders' socio-economic background. It thereafter proffered applicable strategies for formal re-structuring of street trading business in Nigeria.

III. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Comprehensive data on occupational hazards and illnesses due to street trading activities are not common especially in developing nations. Available information relates to street trading activities in South Africa, Ghana, Kenya and India (Mitullah, 2004; Lund, 1998; Lund & Skinner, 2003; Ebigbo, 2003; Nirathron, 2006; ILO, 2006; Kusakabe, 2006; Skinner, 2008; Sylvia, 2010). Studies that dissect gender variations in street hawking activities and their health are not popular in Nigeria. However, with the magnitude of people engaging in the trade, the bad road and unmanageable manner of traffic suggests that such activities cannot be free of hazards. By definition, "work hazard" means the danger or risk encountered in doing or carrying out

specific operation in the workplace. A work hazard is a potential damage, harm or an adverse health effect the worker experienced from working or exposure to certain working conditions that include the materials, substance they use, the process and the practice involved in that job (Lu, 2005). Lu (2011) observed that occupational hazards and health challenges vary by occupational sector and the specific job of the individual.

The nature of street trading in Nigeria is such that can be engaged in by anyone because the job only requires low human and financial capital unlike like other businesses in the informal sector. It is a form of micro-entrepreneurial business. Besides, in most countries, street hawking forms a crucial part of the logistics structure and in most cases serves as the last channel in the chain of production, distribution and consumption.

Specifically, street trading entails displaying wares by the roadside, carrying head pan or raising a sample of wares to the commuters while these vehicles are moving. Thus, the road is being shared between sellers and the motorists. Although, the congestion emanated therein could slow down vehicular speed, the ensuing hustling and bustling in the midst of seemingly uncontrollable 'traffic jam' is likely to be dangerous for women health (Wayne, 1997; Lee, 2004; Ekpenyong & Sibiri, 2011). The health hazards involved in running after a moving vehicle in an attempt to sell goods to the buyers is risky in nature taking into consideration that they (the hawkers) have no control over the traffic. Therefore, considering street trading, it is not unlikely that women could suffer from musculoskeletal disorders as a result of the nature of the trade which entails long standing or running on the roads. Lu (2011) categorically indicates that certain hazards can lead to some forms of occupational illnesses, and that in most cases, women are more vulnerable. Their exposure can lead to tiredness, pains, headache, lesser birth weight and risk of spontaneous abortion in the case of pregnant women. These sicknesses cannot by any means exclude other reproductive dysfunctions that are medically associated with stress, high blood pressure and unhealthy job conditions.

Vagaries of adverse health effects related to street trading include but not limited to body injuries (accidents), diseases, changes in the way the body functions, growths, effects on a developing fetus (teratogenic and fetotoxic effects), decreases in life span, change in mental condition resulting from stress, traumatic experiences, to mention but few (Lu, 2005; ILO, 2009; Canadian Centre for Occupational Health and Safety, 2009; Agius, 2010). While some of these diseases manifest immediately, others are delayed, and some may not be revertible. Workplace hazard can cause harm or adverse effect to an individual or the organization. Hazard is simply conjectured (in this context) as those working conditions that pose threats to worker's health, life, properties and

communities they impact. The chance or probability that a worker will be harmed or experienced adverse health effect if exposed to a hazard is regarded as risk. It also necessary to indicate here that the gravity of the adverse health the worker suffers is a function of the duration of the exposure, health status of the person exposed and the severity of such conditions the work exposed to (Agius, 2010). Therefore, considering the seemly 'fragile' health condition of women and the 'modus operandi' of street trading, it is not likely that their feminine nature will be able to cope adequately with trading activities on the highways. Perhaps if they are able, the long-run effects could be dangerous. Where both men and women traders compete for the same customers under the same conditions, it is not unlikely that women will be more exposed to hazards therein.

a) *The Theory of Work Stress*

The theoretical model adapted is the Model of Work Stress as developed by Palmer et al 2003 (Palmer, Cooper & Thomas, 2003). The model explains that the exposure of the worker to higher volume of workload, complexity of work and hazardous work environment produces stress in the worker (Palmer et al, 2003; 2004; Blaug, Kenyon & Lekhi, 2007). The theory indicates that stress raises blood pressure, engenders sleep and gastro-intestinal disturbances, cause back pain, tension, headache and palpitation. Adapting this theory, Irniza (2011) confirms that there is a significant correlation between urban traffic policing and respiratory symptoms of asthma, exposure to particulate matter, mental stresses and so on. It is indicated that the prevalence of stress is higher among urban traffic police officers compared to others (Irniza, 2011) and that exposure to air pollution have negative effects on mental health and well-being. Thus, if traffic police are susceptible to the above health challenges, then women that trade in the traffic (street traders) should be more vulnerable taking into consideration that they are already overwhelmed with fear of harassment by government authorities or associations.

Besides, these highlighted symptoms and their effects (both in the short and long run) would be inimical to women generally and could be more dangerous to those in child bearing age and the young folks who are the future mothers. In another perspective, work stress has been confirmed capable of influencing coronary heart disease, heighten anxiety, depression and burnout, to mention but few of them (Folkman, et al, 1986; Palmer et al, 2004; Blaug et al, 2007). While this study is not a causality study, the suspicion correlation between health challenges and workplace health hazards in a country with high level of maternal mortality coupled with innumerable number of women in the business, should be worrisome. Street hawking is a stress generating activity and its effects on women operators in Nigeria are examined in this study.

b) *Research Methods*

The study assessed women in street trading business in urban centres of Nigeria and the implications of their jobs on their health. It adopted quantitative research and 'non-participatory direct observation approach' in gathering information on the "modus operandi" of street trading activities in Nigeria. The study also dissected the health risks associated with street trading activity and proffer 'auctionable' strategies towards free-health-risk hawking in Nigeria and sub-Saharan Africa. The data used in the qualitative segment were extracted from 3,873 street traders data collected from the Central Business Districts (CBDs) areas across three major cities of Nigeria, namely, Lagos (in the South-west), Kano (North west) and Port Harcourt (South-south). The data was collected through structured face-to-face interview among the street traders. Only the women data (n = 1,613) was therefore extracted and analysed for this section. Since, there is no doubt that economic effects impact on individuals differently and by age, it was considered necessary, to analyze the data according to specific age grouping. Also, more than 22 items of trade were recorded in the open-ended question but only 9 categories emerged after the 'axial coding' procedure. Quantitative data were thus analyzed using a combination of univariate and multivariate analyses in determining the interrelationship among the variables of interest. The information from non-participatory direct observation was also presented as complement to survey results.

IV. RESULTS AND DISCUSSIONS

a) *Socio-demographic profile of respondents*

As typical of any nation with younger population, the result shows that there is higher proportion of women street traders in the younger age group (15-34). The average age of women traders is 26 years indicating that the majority of women street traders are young women in their prime of age (Appendix I, Table 1). More than half of the women (53.2 percent) were single as at the time of the survey while the separated, widowed or divorced were 4.1 percent and about 42.7 percent were married as indicated in table 1. The high proportion of singles accounts for the migratory nature of the traders. Respondents in this category could be regarded as 'adventurers' who move in and out of the environment in search of greener pasture. The age distribution of the women street traders depicts a normal distribution with the peak concentrated at age 25-34 years and declining after age 44 (Table 1). The result among others also indicated that 1.1 percent of the traders are below 15 years of age. While the under-15 are not expected to be working by the law, it attests to the prevalence of child labour in Nigeria similar what obtains in other developing nations. This is primarily fueled by poverty

and government's inadequacy to cater adequately enough for the population.

Out of the three geo-political zones selected for the study, women from the south-east geo-political zone constitutes about half of the traders interviewed. The proportion from the south west is 44.6 percent while only 6.5 percent of the women are from the north-west. The reason that could be adduced for this lower proportion could be the 'pudah' practice in the North. The women are not permitted by Islamic tenets to work and their movements are so restricted to the households. The religion affiliation statistics indicated that Muslim only constitutes 19.2 percent while eight out of every ten women street traders interviewed are Christians.

Another important socio-demographic variable analyzed is the number of children ever born (CEB) by the respondents. This typically measures the average number of children that a woman has ever given birth to. In this context, all the women interviewed were asked to indicate the total number of children they have ever had. This is used among other things, to evaluate their fertility behaviour and to provide an overview of the likely economic burden of children on their trading activities. The result (as indicated in table 1) shows that average CEB is 4 children and 71.4 percent of the respondents are at zero parity. This corroborates the earlier findings that larger numbers of the traders are singles. This is a fundamental characteristic that makes them more vulnerable to physical and job mobility. In addition, the proportions that have five children and above are only 3.8 percent (table 1).

The employment status is used to categorize the ownership of business into employees, apprentices, family workers or own-account workers. The result of the analysis shows that eight out of every ten women street traders are 'own-account workers'. Precisely, 84.1 percent claimed to own the business they are doing (Table 1). Those that are working for family members or directly receiving wages from the activities and the volunteers are 7.6 percent. The employees constitute only 6.5 percent while those that are under training (i.e. apprentices) are less than one percent (Table 1).

Several variables were used in evaluating the vulnerability of women in street trading activities to workplace hazards. Prominent among them are the nature of the trading, product category, frequency of selling articles on the roads, experience of harassment, frequency of engaging in other secondary occupations, etc. These variables are selected to assess the vulnerability to stress and other associated health risks inherent in them. The result shows that about half of the respondents (48 percent) are peddlers who rove (move along) on the roads to sell their wares while the sedentary traders are 52 percent. This latter group involve individual sellers who are seemingly desk-bound e.g. sellers that uses table tops, makeshift shops, spread their wares on the ground or use display glass

boxes by the road side. The result also indicates that half of the women interviewed are constantly 'sharing' the road with the 'moving vehicles' in an attempt to sell their wares. The non-participatory observation shows that an average peddler runs after a moving vehicle to sell his stock. Where the transaction could not be completed before the vehicle accelerates or moves away speedily, the ware or the money is flung to the road by the 'boarded buyer' and the peddler tactically wait for a safe opportunity to pick up the money or the wares as the case may be. Occasionally, those goods are driven on by careless drivers which results into losses for the seller. As indicated in the theory (Palmer et al, 2003; Blaug, Kenyon & Lekhi, 2007; Irniza, 2011), this practice demonstrates the high degree of vulnerability of women to accidents, musculoskeletal disorders, pains, psychological disorders if big losses are recorded in addition to other health challenges like tiredness, respiratory problem due to inhaled combustive flame from the vehicles and other air pollution health problems (Palmer et al, 2003; Lee, 2004; European Agency for Safety and Health at Work, 2005; Abama & Kwaja, 2009; Blaug, Kenyon & Lekhi, 2007; Lu, 2011; Irniza, 2011). Because they have no control over the movement of the vehicles, they can suffer extortion. Commuters may not pay the correct amount before the vehicles 'roll away'. Notwithstanding that higher proportion of them are not married, the stress in street trading can make their bodies to be worked-up. This might become dangerous to their reproductive lives either presently or in the future.

Among the profound discoveries from this study is the rising rate of assault or harassment suffered by the street traders. The survey indicates that more than half of the women street traders have experienced one assault or the other in the course of plying their trades. Precisely, 55.4 percent of the women have fallen victims to such harassment while trading on the streets, 43.6 percent claimed they have never experienced any harassment as shown in table 2 (Appendix II). In the same vein, one in every five women street traders has been injured while trading on the road and 52.1 percent of respondents have witnessed or seen their colleagues injured in the course of trading on the road (Table 2). These revelations are pointers to the degree of work hazards that the women are exposed to. Various harassments indicated range from bullying, beating, seizure of wares, forceful extortions while rape is not impossible (Palmer & Cooper, 2004; Lee, 2004). Although, there is no causal link between the harassment suffered and the injuries sustained, it could be conjectured that these kinds of harassment as observed and also indicated by the respondents could possibly lead to injuries. Harassing these traders in the midst of traffic is considered extremely dangerous and physical accident and loss of lives are not impossible.

The study further assessed the respondents' earnings notwithstanding the sensitive nature of the measurement and that it is always fraught with challenges (Moore, Stinson & Welniak, 1997; Davern, 2003). Notwithstanding however, respondents were asked to indicate their total income per week and their average daily expenditure. The result shows that the average sale per day is less than ₦2,500. 86.6 percent of the women sell below ₦10,000 worth of goods daily. Those that record between ₦10,000 but less than ₦20,000 worth of goods are 9.2 percent while only 2.2 percent sell goods worth ₦20,000 and above as shown in table 1. The observed daily expenditure is not commensurate with the total weekly sales observed. Majority of the respondents expended up to ₦5000 as their daily expenditure while 13.2 percent indicated more than that amount as their daily expenditure. Although, no further verification was made on these claims, the non-

$$\ln\left\{\frac{P_1}{(1-P_1)}\right\} = \alpha_0 + \beta_1 X_{11} + \beta_2 X_{21} + \beta_3 X_{31} + \beta_n X_n + e \dots \dots \dots (i)$$

Where, α_0 represents the intercept, e implies the residual value (or the error term). The X_s are the various street trading activities selected as predictors while the Beta (β) denotes the coefficients of the X_s . The P_i and $(1-P_i)$ means the probability of sustaining injury and the probability of not sustaining injury respectively.

$\ln\left\{\frac{P_1}{(1-P_1)}\right\}$ Is therefore represents the log of the ratio of probability of incidence of injury to the log of probability of no injury.

The result of the analysis shows that all education categories, nature of trading, religion affiliation, and the intermediate age group (15-24 years) are negatively associated with incident of injury. Positive associations were observed among location of study, employment status, marital status searching for other jobs, employment status, marital status and the intermediate age group of the respondents and incident of injury. Specifically, the result indicated that respondents with primary, secondary and tertiary education are 0.879, 0.553 and 0.818 less likely to be injured while trading on the street compared to individuals who have no formal education. However, only secondary education is statistically significant (P-value = 0.015). Similarly, while migrants from the south are 1.827 times more likely to experience workplace hazards, their counterparts from the north will be 2.678 times more likely to be exposed to incidence of injury. The results are statistically significant at p-values 0.014 and 0.005 respectively. The significance influence of religious affiliation indicated that the Christians and Moslems traders are 0.153 and 0.235 times less likely to experienced injury on the road compared to the tradition region (p-values of 0.019 and 0.075 respectively).

The result further indicated that only the intermediate age (15-24 years) is negatively related and

participatory observation indicated that it is not likely that their businesses cannot cater for their daily upkeeps on the basis of the volume of wares they carry or sell on the street. Among the specific reasons for involving in street hawking are inability to secure formal jobs, constraints (including finance) in gaining admission to higher school and joblessness of the family's breadwinners.

b) Logistic regression estimating the relationship between selected profile of respondents and vulnerability to workplace hazards

Only one hypothesis was tested to confirm the interrelationship between activities inherent in street trading and the incidences of injuries among the operators. The variable "ever injured" is interchanged with workplace hazards. A logistic regression analysis was used in testing this hypothesis. The model is depicted as:

are 0.801 times less likely to be involved in accidents on the street than other age categories. This group is more agile in nature and possesses the ability to swift movement which could aid them to escape or 'dodge' accident. In the same vein, those in age group 25-34, 35-44 and the under aged (less than 15 yrs) are 1.023, 1.024 and 1.599 more likely to experience workplace accidents vis-à-vis the reference category (age 45 and above). Marital status is observed not be significantly related to the incidence of injury.

Women who have experienced harassment are 1.195 times more susceptible to injury compared to those who have never experienced any form of harassment while running their businesses on the streets. Overall, the model summary shows 81 percent accuracy though the interrelationship evaluated is relatively weak as shown by Cox & Snell R Square of 0.043 and Nagelkerke R Square of 0.068.

V. CONCLUSION AND RECOMMENDATIONS

The result of the analysis shows that street trading is a risky type of business activity that makes women to be more vulnerable to workplace hazards. The exposure of women in this regard should not be taken for granted. Besides, maternal health could undoubtedly be negatively affected as a result of perennial physical exhaustion, physical abuse and inherent stress in street trading. However, the fact that the magnitude of women participating in street trading is high implies that its re-organization will yield economic dividends for the nation. Without gainsaying, the job has provided opportunities for entrepreneurship and self-employment. However, the impact of the business on the welfare of the operators is not very obvious at least if weekly income is compared with high weekly

expenditure recorded in the study. This would be likely impairing opportunity for re-investment and as such keep the women poor continuously. The authors suggest that due recognition be given to the activity and street traders-government initiative or partnership be put in place in order to safeguard the health of the operators.

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Table 1 : Socio-demographic profile of women street traders.

Socio-demographic Variables	No	%	Socio-demographic Variables	No	%
Geo-political Zone			Employment Status		
South-West	720	44.6	Self Employed	1356	84.1
South-East	788	48.9	Employee	105	6.5
North-West	105	6.5	Unpaid family worker	115	7.1
Total	1613	100.0	Apprentice	28	1.7
Age Group			Volunteer & Others	9	0.5
Less than 15 years	17	1.1	Total	1613	100.0
15-24 years	536	33.2			
25-34 years	557	34.5	Earning per week (₦)		
35-44 years	241	14.9	Less than ₦2,500	659	40.9
45-54 years	87	5.4	₦2,500 - ₦4,999	472	29.3
55-64 years	23	1.4	₦5,000 - ₦9,999	264	16.4
65 & above	152	9.4	₦10,000 - ₦14,999	109	6.8
Total	1613	100.0	₦15,000 - ₦19,999	39	2.4
Mean age = 25.9 years ≈ 26 years			₦20,000 & Above	34	2.1
Marital Status			Total	1577	97.8
Never married	858	53.2			
Married	689	42.7	Average Expenditure per Day		
Separated/Divorced	24	1.5	Less than ₦1,000	870	53.9
Widowed	42	2.6	₦2,000 - ₦2,499	408	25.3
Total	1613	100.0	₦2,500 - ₦4,999	122	7.6
Religious Affiliation			₦5,000 - ₦7,999	38	2.4
Christianity	1296	80.3	₦8,000 & Above	175	10.8
Islam	309	19.2	Total	1613	100.0
Traditional	8	.5			
Total	1613	100.0	Children Ever Born (CEB)		
Educational attainment			Zero parity	1152	71.4
No Schooling	195	12.1	1-2 children	175	10.8
Primary Education	277	17.2	3-4 children	225	13.9
Secondary Education	761	47.2	5-6 children	55	3.4
Tertiary Education	380	23.5	7 & above	6	0.4
Total	1613	100.0	Total	1613	100.0

Source : Street Trading Survey 2011.

Appendix II

Table 2 : Logistic regression illustrating the interrelationship between street trading and exposure to hazards.

Selected Variables	B	S.E.	Wald	df	Sig.	Exp(B)
Location						
Lagos	0.288	0.368	0.609	1	0.435	1.333
Port Harcourt and Aba	0.677	0.372	3.307	1	0.069	1.967
Kano	RC					
Employment Status						
Self-employed	0.198	0.254	0.611	1	0.434	1.219
Employees	0.361	0.354	1.043	1	0.307	1.435
Others Employment Status	RC					
Job satisfaction						
Looking for another job	0.103	0.148	0.490	1	0.484	1.109
Not searching for other job						
Education Attainment						
Primary Education	-0.129	0.250	0.264	1	0.607	0.879
Secondary Education	-0.592	0.243	5.951	1	0.015	0.553
Post Secondary Education	-0.201	0.253	0.627	1	0.428	0.818
No schooling only	RC					
Marital Status						
Single	0.756	0.407	3.452	1	0.063	2.129
Married	0.116	0.382	0.091	1	0.762	1.122
Separated /Widowed	RC					
Nature of Trading						
Sedentary	-0.042	0.143	0.086	1	0.770	0.959
Peddlers	RC					
Religion Affiliation						
Christians	-1.878	0.800	5.507	1	0.019	0.153
Moslems	-1.450	0.814	3.169	1	0.075	0.235
Tradition	RC					
Migration						
North-west	0.985	0.350	7.905	1	0.005	2.678
South (All)	0.603	0.245	6.043	1	0.014	1.827
Non-Nigerians	-18.837	40192.769	0.000	1	1.000	0.000
Age Group						
Less than 15 yrs	0.469	0.619	0.575	1	0.448	1.599
15-24 yrs	-0.221	0.260	0.727	1	0.394	0.801
25- 34 yrs	0.023	0.253	0.008	1	0.928	1.023
35- 44 yrs	0.024	0.316	0.006	1	0.940	1.024
45 yrs & above	0.178	0.370	0.231	1	0.631	1.194
Harassment						
Harassed	0.178	0.148	1.459	1	0.227	1.195
Constant	18.169	40192.769	0.000	1	1.000	77719441
Overall Percentage = 80.8				Cox & Snell R-Square = 0.043		
-2 Log likelihood = 1398.784				Nagelkerke R-Square = 0.068		

Source : Street Trading Survey 2011.

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- Not at all, take in raw data or intermediate calculations in a research manuscript.



- Do not present the similar data more than once.
- Manuscript should complement any figures or tables, not duplicate the identical information.
- Never confuse figures with tables - there is a difference.

Approach

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- If you desire, you may place your figures and tables properly within the text of your results part.

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Approach:

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