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Gender Biases in Professions

Qudsia Tariq
Department of Psychology
University of Karachi, Karachi

Despite improvements in the positions of women at work Gender biases still exist in professions, some are assigned high and some low status. High status profession usually attracts high pay and status. The aim of this research was to study and identify gender biases in professions. The following hypotheses were formulated; 1- The professions that are assigned high status are associated with men as compared to women. 2- The professions that are assigned low status are associated more with women as compared to men. 3-Men are more biased against women than men. 4. Women are more biased against men than men. A sample of 100 men and 100 women professionals and non professional participants with ages 20-35 years were randomly selected from various institutions of Karachi. In addition to the demographic information collected from the participants, a gender bias Questionnaire was developed by the author to measure the perceived association of gender with different professions. To rate the professions as high or low status a list of 10 professions i.e., physician, lawyer, engineer, architect, psychotherapist, receptionist, secretary, sales person, teacher, and librarian was used. This list was prepared from a pool of 35 professions after doing a pilot study to select high and low status professions. The status and gender associated with each profession is rated on a 7 point rating scale. The results showed a strong positive correlation between male gender and high status profession, which provides an evidence for biases, exists for women at work places. The t-test analyses further highlighted that women were biased more against women as compared to men. The study concludes that even though women are entering into various high status professions, the gender discrimination still exists.

Keywords: Professions, Gender Biases

Most of what has been traditionally labeled as the sexual division of labor is in fact a gender division of labor. In this way, opinions vary in terms of which attributes constitute biological differences (sex) and which are socially determined (gender). The notion of biological difference is often used to justify discriminatory beliefs about women and men's relative intelligence, emotional behavior or suitability to certain jobs (Haq, 2000).

When examining gender bias, it is important to define and understand the term. The American Heritage Dictionary defines gender as "classification of sex". According to the same source, bias is defined as "preference or inclination that inhibits impartial judgment, or an unfair act or policy stemming from prejudice" (American Heritage Dictionary, 2000). Thus gender bias is separation of gender in a way, which prefers one sex to the other. Gender bias in occupation refers to preference for or favoring of one sex over the other at workplace. Gender biases are deeply rooted in our society, with some jobs deemed totally inappropriate for members of the opposite sex. Such stereotypes are even more pronounced in many foreign cultures.

Gender stereotypes of occupations are manifested in the belief that certain occupations (e.g., nurse, teacher, secretary, etc.) are "women's" occupations and others (e.g., automotive mechanic, engineer, and medical doctor) are "men's." A number of studies (Shepard & Hess, 1975; Shinar, 1975; Rush & Greenwalt, 1977; White, Kruczek, Brown, & White, 1989; Freedman, Podsakoff, & Mackenzie, 1993; St. Pierre, Herendeen, Moore, & Nagle, 1994) have previously examined gender-stereotyping in occupations. Each of these studies concluded that gender stereotypes of occupations do exist. According to Guirdham (2002), women managers are more inclined than men to try to act as good examples, which places them under extra pressure to perform, ingratiate and possibly to supplicate. These self-presentations in turn reinforce gender stereotypes of women as weak and dependent, leading to the impression that they lack some of the abilities required for higher level positions.

Much of the workplace is divided into "women's work" and "men's work" (Reskin & Hartmann, 1986). In fact, occupational gender segregation is so pervasive that researchers project that 53% of workers (women or men) would have to change occupations in order to achieve full gender integration (Reskin & Padavic, 1994). This uneven distribution of women and men into occupations both reflects and reinforces stereotypes about the gender-typing of occupations.

The representation of women in leadership positions in academic institutions, scientific and professional institutions and societies, and honorary organizations is low relative to the number of women qualified to hold these positions. It is not lack of talent, but unintentional biases and outmoded institutional structures that are hindering the access and advancement of women (Alessio & Andrzejski, 2000).

At times the social pressures regarding the gender roles are so intense that women and men are afraid to select *new careers, out of f*ear of rejection and ridicule by the society. It is supported by the findings of the study carried out by Cherry and Deaux (1978), in which both women and men rated both women and men targets negatively when they succeeded in nontraditional occupations. It could be speculated that if such fears persist till date, these could influence occupational pursuits such that women and men avoid nontraditional occupations, ultimately maintaining the status quo of occupational segregation. It has been observed that whenever someone tries to deviate from the gender roles assigned to them, they face rejection and ridicule from the society. The same is projected in case of women when they opt for a job which is considered to be masculine in description.

Research on reactions to competent women found that such women were socially (Hagen & Kahn, 1975) and professionally (Hodson & Pryor, 1984) rejected. Most interestingly, women and men rated a target woman as least attractive as a work partner when she combined competence with high career orientation and masculine preferences (Shaffer & Wegley, 1974).

Another research by Greenhaus and Parasuraman (1993) also reflected biased attitude. According to the findings of their study, performances of the most highly successful women managers were less likely to be attributed to ability than those of their comparable male counterparts.

Gender segregation of occupations refers to the employment of men and women in separate occupations, whether at the occupational, industry, or organizational level (Perry, Davis-Blake' & Kulik, 1994). Reskin and Hartmann (1994) assert that gender segregation in occupations has been a tradition in the U.S. work force for decades and that the degree of gender segregation in the work force has not changed much since the early nineties. In 1985, occupations which comprised at least 70 percent women employed greater than two-thirds of all working women (Jacobs, 1989). Moreover, gender segregation in occupations according to Jacobsen (1994) exhibited somewhat a downward trend

during the period between 1960 and 1990. This trend was remarkably slow, leaving quite high levels of segregation. He further asserts that without drastic social change, little movement in desegregation is likely by the turn of the century. In addition to segregation in occupations, where both genders do share the same job titles in some occupations across organizations, rarely do they share the same job titles within an organization (Bielby & Baron, 1986). Field studies have shown that gender segregation at the organizational and industry level are also common, even for occupations which seem to be integrated across organizations or industries (Bielby & Baron, 1984 to 1986; Reskin & Hartmann, 1986; Baron, Mittman, & Newman, 1991). Indeed, many believe that such gender segregation of occupations is the foundation for gender differences in labor market outcomes. (Reskin, 1984; Deaux, 1985; Bielby & Baron, 1986). Such differences include disparities in wages and salaries, benefits (including training opportunities), promotions, prestige, and power (Reskin & Hartmann, 1986). Several field studies have shown that male-dominated organizations are more segregated by occupation than organizations which employ a large percentage of women (Bielby & Baron, 1984).

Although women constitute about 45% of the labor force in the United States, they are concentrated at the lower end of the status hierarchy. Women tend to hold jobs such as of secretary or receptionist, which provide relatively low income and primarily men hold prestige such as of lawyer and physician. Some employers still prefer to hire men for jobs requiring technical and managerial skills based on the gender role stereotypes that men are more competent at such tasks (Gerdes & Garber, 1983). The job opportunities for women have improved since 1970's with considerably more women moving into such lucrative jobs as lawyers, physicians and engineer. But the dark side of the issue is that women still almost exclusively fill the low paying and the low prestige jobs.

Women always had lower status than men, but the extent of the gap between genders varies across cultures and time (some arguing that it is inversely related to social evolution). In 1980, the United Nations summed up the burden of this inequality: "Women, who comprise half the world's population, do two thirds of the world's work, earn one tenth of the world's income and own one hundredth of the world's property".

According to Phillips (1998) it is of interest to note that girls have caught up with boys in math and science achievement and that the gender gap has been closed. Women are filling the ranks of the professions and

entering high status, high salary jobs. Although the gifted male in college has not given up his math and science interests, he is in danger of giving up something much more important: his opportunity to choose a career based on his most deeply held values. Most gifted men, no matter how strong their interests in creative arts, languages, humanities or literature, have given up these interests because they do not seem lucrative or perhaps manly enough (Colangelo & Kerr, 1993).

In the light of above literature review the following hypotheses were formulated

1- The high status professions are related more to males as compared to women.
2- The low status professions are associated more with females as compared to men.
3- Men are more biased against women as compared to men.
4- Women are more biased against males as compared to men.

Method

Research design

The design of the study was a 2 x 2 factorial design crossing target gender with occupational gender bias, high status /low status professions.

Sample

A sample of 200 men and women with at least graduation were randomly selected from various institutions of Karachi (both professionals and non professionals) with age ranged from 20 -35 years. Most of them were bilingual and some multilingual. All of them had complete orientation with English language as it was the requirement of the research.

Measures

Gender matching with occupation list. The list was prepared by the author. 100 undergraduate student volunteers (50 men and 50 women) enrolled in business institutions at Karachi were asked to rate each occupation at high status or low status on a 7 point rating scale. The mean rating for status (high/low) were calculated separately for each occupation. Out of 35 only 5 were highly rated for low status and 5 were rated high for high status. From among the 10 occupations, physician, lawyer, engineer, architect, psychotherapist were rated as high status and on the other hand receptionist, secretary, sales person, teacher, and

librarian were rated as low status professions. This final list of 10 professions was used to measure occupation considered as high and low status. Each occupation was rated on a 7 point rating scale, where rating of "1" showed low status, "4" showed neutral and "&" showed high status of that occupation.

Gender bias questionnaire. This questionnaire was designed by the author to identify the existing gender biases in both high and low status professions. The questionnaire was designed on the basis of projective technique. It appeared to the participants a test of English grammar but actually it tapped their biases on the unconscious level. For example, one of its items is, 1- After a detailed checkup, the physician prescribed ..... patient some medicines (His/her). The response given as "his" shows inclination towards male and "her" would show inclination towards females. Highest ratings as "his" showed male bias against females and highest ratings showed as 'her' reflect female bias against males.

A demographic questionnaire. This was prepared by the author containing important information about the participant regarding age, gender, education, occupation and some other information like command on English language, views of opposite gender regarding their professional abilities etc.

Procedure

First the permission from the heads of various professional and non-professional institutions, (which come under the domain of Karachi University), was sought to collect data from their institute/organization. They were told about the nature and purpose of the research. After their permission, participants were approached. Rationale of the study was not revealed to the participants. Anonymity as well as confidentiality of their responses was assured. After taking some personal and demographic information, each participant was asked to rate the status of the occupations on the 7 point rating scale according to the standard instructions provided. In the end participants were asked to complete the questionnaire measuring gender biases in occupations. After the data collection, the participants of the research were informed about the actual rationale and aim of the study and were reassured of confidentiality regarding their identity and results.

Results

Table 1

Percentages of the participants in assigning high & low status to professions (N=200)

Occupations	Professional Status			
	High n=200		Low n= 200	
	f	%	f	%
Phys	178	89	22	11
Eng	164	82	36	18
Law	144	72	56	28
Arc	146	73	54	27
Psy	158	79	42	21
Sec	6	3	194	97
Recep	2	1	196	99
Teach	80	40	120	60
Lib	40	20	160	80
S P	22	11	178	89

Note: Phy= Physician, Eng= Engineer, Law=Lawyer, Arc=Architecture, Pys= Psychotherapist, Sec= Secretary, Psy=Psychotherapist, Recep= Receptionist, Teach= Teacher, Lib= librarian, Sp= Sales Person.

Table 1 shows how the majority of the participants perceived and rated physicians , engineers, lawyers, architects and psychotherapist as high status professions, whereas, sectary, receptionist, teacher, librarian and sales person were perceived and rated as belonging to low status professions.

Table 2

Percentage of both men and women participants in assigning high & low status to all the 10 professions.

Occupations	Professional Status			
	Men n=100		Women n= 100	
	High %	Low %	High%	Low%
Phys	76	24	88	12
Eng	72	28	79	21
Law	70	30	81	19
Arc	81	19	76	24
Psy	80	20	82	18
Sec	13	87	30	70
Recep	11	89	32	68
Teach	35	65	23	77
Lib	31	69	30	70
S P	24	76	22	78

Note: Phy= Physician, Eng= Engineer, Law=Lawyer, Arc=Architecture, Pys= Psychotherapist, Sec= Secretary, Psy=Psychotherapist, Recep= Receptionist, Teach= Teacher, Lib= librarian, Sp= Sales Person.

Table 2 looks at higher and low ratings of professions by men and women. Trend of rating by both genders is similar to what was observed for the total sample in table 1.

Table 3

Correlation between perceptions of participants about professions (rated as low) with its perceived association with gender. (N=200).

Occupations	Gender	r
Secretary	M	-0.52 (n.s)
	F	0.71**
Receptionist	M	0.24**
	F	0.60**
Teacher	M	0.41**
	F	0.82**
Librarian	M	0.32**
	F	0.69**
Sales person	M	0.54**
	F	0.56**

Note= M= Male, F=Female, (n.s) =non significant, ** P<0.01

Table 3 shows that both male and female perceived the professions like secretary, receptionist, teacher, librarian and sales person to be low and how they associated and related more with the females.

Table 4

Correlation between perceptions of participants about professions (rated as high) with its perceived association with gender. (N=200).

Occupations	Gender	r
Secretary	M	0.83**
	F	0.64**
Receptionist	M	0.62**
	F	-0.65**
Teacher	M	0.72**
	F	0.21**
Librarian	M	0.76**
	F	-0.59**
Sales person	M	0.81**
	F	0.41**

Note: **= P<0.01. M=Male, F= Female

Table 4 shows that professions perceived and rated as high were associated more with men especially engineering and architecture.

Table 5

Gender differences in assigning high status professions to the other gender (N=200)

Groups	M	SD	df	t
Men	8.89	3.0	198	2.66*
Women	7.67	2.9		

Note:*=p<.05

Table 5 explains that perceived high status professions were more frequently associated to men as compared to women. This unfolds the gender biased thinking pattern as was assumed.

Table 6
Gender differences in assigning low status professions to the other gender (N=200).

Groups	M	SD	df	t
Male	7.11	3.41	1.98	3.16*
Female	8.21	2.97		

Note= *= P<0.05,

Table 6 explains that women are more frequently associated with low status professions as compared to men. This again reveals a biased and sex discrimination approach as hypothesized.

Table 7
Percentages of males and females participants showing biased responses towards opposite sex. (n=100 in each group)

Gender	Biased Responses Against	
	Males %	Females %
Male	35	65
Female	42	58

Table 7 reveals that existing social thinking pattern that not only biased against women but even women do not spare their own gender and leash them with their biased approach.

Discussion

The aim of the study was to see the gender differences in various high and low status professions. It became quite evident by the results that gender biases do exist till date in Pakistani society. The first hypothesis "The high status professions will be related to males as compared to females" was accepted and the results are in line with what was found by Cejka and Eagly (1999) that gender biases exist in those occupations which have given higher prestige and attract high earnings and prejudice against women persist worldwide. This would not be unexpected in societies in which men have traditionally been considered the bread winners, and in which women have only relatively recently entered the workforce in significant numbers (Herz & Wootton, 1996). In fact, author of this study suspects that in these societies work itself may be stereotyped as masculine due to gender bias. Moreover, as business

organizations have traditionally possessed "masculine" cultures, it could be suspected that people are more likely to "default" to a masculine stereotype for high status professions.

The organizational status refers to the socially defined position and rank given to an occupation based on power, high pay, preferred work schedules and so on (Niakao & Treas, 1993). Hence the status of the professions is determined by position of power, high pay scale and high level of prestige attached with them. Results of the present study also show that participants rated those professions as having 'high status' which according to social perception had an element of prestige and good salary package attached with it. Even in rating the status of a profession there was some gender differences observed.

There was a strong positive relation found between Male gender and high status of profession. On the other hand the second hypothesis "The low status professions will be associated more with females as compared to males" was also supported as most of the professions which were low in status were highly rated for female gender. The results reflect that gender biases are deeply rooted in our work culture and society. It cuts a sorry figure that even though Pakistan has nuclear technology but still is unable to change stigmatization way of thinking against women. According to some of the researches the low status and less prestigious professions are till date associated with females. Women are more frequently offered lowest paid manual and non manual occupations (Cejka & Eagly, 1999).

Even today, less prestigious and least paid career of nursing is frequently taken up by women as men consider it less prestigious for their gender. It is evident from enrollments in nursing schools in different time periods where it remained stable (Digest of Education Statistics, 1992).

The third hypothesis that " The Males participants will be more biased against females in assigning them a high status professions as compared to when assigning them to males also stands confirmed. It is a male dominating society the men were more biased against women and keeping in view the gender stereotypical roles even the women were biased against women as they felt that women should come only in those professions which are female oriented. Dovidio and Gaertner (1986) proposed a theory of "aversive racism" whereby seemingly egalitarian people avoid overt forms of discrimination yet persistently engage in more subtle forms of differential treatment & exhibit subtle biases when the probes for stereotypic responses are less direct. It also is conceivable

that the gender and gender-role attitudes of individual raters will influence their responses.

The profession of physician was more or less rated equally for both genders by the participants. One of the reasons is that the gender roles are changing and are learned behaviors in a given society because of economic crisis and increasing educational levels. This is further supported by the gender composition of medical school that has changed substantially from 13% women in the mid-1970s (Taeuber, 1991) to 33% in 1990s (Reis & Stone, 1992).

Exploring the relative impact of job content, employees' personality, and gender ratios on occupational stereotyping, Krefting, Berger, and Wallace (1978) concluded that gender imbalances signal prospective employees that a job is or is not suitable for their own gender category. In other words, what made medical school masculine in the 1970s was not the tasks physicians did (job content) and not the personal characteristics of doctors (personality), but simply the basic demographic fact that most medical practitioners were men

On the other hand the fourth hypothesis stated that "females participants will be more biased against males in assigning them a high status profession as compared to when assigning them to females" was rejected as the results not only males are biased in assigning a high status profession to females but even females think that women lack the abilities to hold high status designations. Hence not only the female participants rated their gender to be less suitable for high status jobs but also preferred them to be more suitable for low status jobs.

The attitudes are slowly changing as in the present study, two out of five high status professions were equally rated for women which shows an attitude change coming in the society. Regarding changes in attitudes, Gallup polls conducted in 1975 reported that 37% of women and 43% of men agreed that a woman with the same ability as a man would have an equal chance of becoming an executive and 27% of women and 32% of men would prefer equally a woman or man boss (Simon & Landis, 1989). The same questions asked in 1987 showed stronger support for women in nontraditional roles of managers and bosses. 46% of women and 50% of men agreed that women would have equal opportunities to be a manager and 39% of women and 57% of men expressed equal preferences for women and men bosses. These opinions reflect significant attitudinal changes across 1980s.

Limitations, Suggestions and implications

The present study takes a step forward in helping to understand the nature of gender-stereotyping and gender segregation of occupations. However, further investigation is needed to confirm the findings reported above especially keeping in view the limitation of the research which catered either high status occupations or low status professions and did not consider the mediocre status professions.

Future research paradigms should also include "gender-neutral" occupations along with strongly masculine-typed and feminine-typed occupations as part of the designs. Moreover, these studies could go a step further by asking subjects to assign salaries to the occupations after rating them. This would shed additional light on the perceived worth of masculine-typed versus feminine-typed occupations.

Finally, future research should also consider the use of a more heterogeneous sample of subjects. For example, including subjects other than college students, such as college graduates and non-college-educated persons, would lend reinforcement to the generalizability of the present study. In addition, it might be interesting to include persons who are employed in organizations similar to the ones described in the study.

If the current study can be replicated on the organizational sample, there could be meaningful implications for the training of recruiters and managers who work in gender-typed organizations. For instance, those who recruit and hire in masculine-typed organizations might receive training aimed at helping them shed gender biased perceptions that high status professions possess certain "masculine" qualities and only men can be employed for such posts.

There are also potential implications for organizations related to the recruitment of women. For example, the job description should be gender neutral more likely to convince women applicants that both high & low status positions within the organization are not "gender-biased" for them.

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Gender Role Attitudes and Attribution of Blame for Spousal Violence in Married Men and Women

Sobia Masood and Anila Kamal, Ph.D
National Institute of psychology,
Quaid-i-Azam University, Islamabad.

The present research aimed at investigating the effects of gender role attitudes on attribution of blame for spousal violence in married men and women. Spousal Violence Blame Questionnaire (SVBQ) was developed which was based on 12 visual scenarios of spousal violence incidents; scenario opinion questionnaire; and background information/story cards. A sample of 120 married participants (60 men, 60 women) with age ranging from 20 to 62 years (M= 35.63) was administered by Gender Role Attitude Scale (Kamal & Saqib, 2004), Dyadic Adjustment Scale (Naseer, 2000) and SVBQ. Experimental group was given the background story before presenting video clips, whereas the control group was shown the clips without background story. Experimental group attributed significantly more blame towards the victim in a spousal violence incident as compared to the control group. Participants considered an incident as spousal violence in case of physical violence scenarios but they did not take it as violence in case of non physical violence.

Keywords: Attitudes, Attribution, Blame, Spousal Violence

A sample of 120 married people (60 men, 60 women) with age ranging from 20 to 62 years (M= 35.63) was administered by Gender Role Attitude Scale (Kamal & Saqib, 2004), Dyadic Adjustment Scale (Naseer, 2000) and SVBQ. Experimental group was given the background story before presenting video clips, whereas the control group was shown the clips without background story. Experimental group attributed significantly more blame towards the victim in a spousal violence incident as compared to the control group. Participants considered an incident as spousal violence in case of physical violence scenarios but they did not take it as violence in case of non physical violence.

The term spousal violence includes physical, sexual, psychological abuse and stalking committed by one spouse against the other in a marital relationship. Spousal abuse is physically or sexually assaulting or psychologically abusive behavior by a partner against the other in an intimate, sexual, peer and usually cohabitating relationship (Ganley, 1982).

As proposed by Kelley (1972), "Attribution processes are to be understood, not only as means of providing the individual with a veridical view of his world, but as means of encouraging and maintaining his effective exercise of control in that world". According to him, people's reactions to victims are affected by their desire to avoid blame for their own future accidents. According to Chaikin & Darley, people make defensive attributions and assign causality in order to maintain or enhance their self esteem (as cited in Kelley, 1972).

Almost all research concerning domestic violence has found an effect of gender. In comparison to men, women are less likely to blame the female victim and more likely to attribute responsibility for the incident to the male abuser (Harris & Cook; Pierce & Harris as cited in Locke & Richman, 1999). Harris and Cook (as cited in Locke & Richman, 1999) found that women sympathized more with the victim, regardless of similarity between the victim and participant. Kristiansen and Giulietti were of the view that whether male or female, as attitudes toward women become more positive, people tend to blame the abuser more than the victim (as cited in Locke & Richman, 1999).

Tang and Tam (2001) has cited the work of many authors according to which people who endorse traditional attitudes toward women and their appropriate gender roles in the society also tend to endorse violence against women-related myths and to blame the victims for their victimization rather than to hold the perpetrators responsible for their violence. In addition, perceived prevalence of violence against women and its negative effects on the victims and community have also been found to influence people's judgments of responsibility, which in turn affect referral, treatment, and rehabilitation decisions for the victims and perpetrators.

Demographic characteristics of age, gender, and educational attainment are related to the assignment of responsibility to domestic violence situations. Despite some mixed results, most studies cited by Tang and Tam (2001) have shown that women tend to assign less responsibility to rape victims than men. Schneider asserted that older people, as compared to their younger counterparts, tend to hold

conservative views about women's roles in the society and assign more responsiblility to female victims of domestic violence (as cited in Tang & Tam, 2001). According to Allison & Wrightsman, as education can provide people with broader perspectives on various human behaviors, those with a higher educational attainment are found to have more liberal views about women and to hold domestic violence victims less responsibility for their misfortune (as cited in Tang & Tam, 2001)..

The above factors are evident in public service professionals' assignment of responsibility to domestic violence victims and perpetrators. Research has shown that victim-blaming attitudes and behaviors among police officers and medical personnel are associated with traditional views of women, endorsement of domestic violence - related myths, and poor knowledge about the effects of domestic violence on the victims (as cited in Tang & Tam, 2001).

According to Acock and Ireland, people with more traditional gender role attitudes have been found to attribute more responsibility to the victim of rape scenario than those who hold less stereotypical and more progressive beliefs about gender. Also traditional sex role attitudes have been found to be related to victim blame for attitude condoning marital rape (as cited in Pollard, 1992).

According to Stormo, Lang, and Stritzke (1997), abuser men assigned more blame to their victims than to themselves, whereas non-abuser men assigned more blame to the personality of the abuser than to other factors. In a case where an equal level of alcohol was consumed by both victim and abuser, the victim will be attributed more blame than the sober victim. This study found that overall, males were assigned more responsibility and blame for the domestic violence than females.

Moore (1998) cited the work of many researchers, according to these studies, sexist attitudes are based on stereotypical views of gender appropriate behavior. Tolerance of spousal violence has been correlated with sexist ideology, hostility towards women, acceptance of interpersonal violence, adversarial sexual beliefs, and rape myth acceptance These attitudes are based on stereotypical beliefs that the male has the prerogative to initiate aggression and to use some pressure to control others. Sexist attitudes were expected to add to the prediction of blame of the target of domestic violence in this study.

Ward (1995) reported the work of Krulewitz & Payne that some studies have shown that women attributed more responsibility to victims, at least under certain circumstances. However, men appear to attribute more blame and responsibility to victims on the basis of their characters

than do women (Ward, 1995). More specifically, men are more likely to perceive a women victim as contributing to the spousal violence incident.

Liberal gender attitudes are the most salient predictors of a low level of responsibility attribution, to domestic violence victims, whereas perceived serious negative effects of domestic violence on the victims are the most salient predictor of a high level of responsibility attribution to domestic violence perpetrators (Tang &Yan, 2003).

There are several reasons for conducting this research. In Pakistan not much research has been conducted on attribution of blame for spousal violence. In review of the existing research on the issues of spousal abuse and family violence, Huisman stated that it is apparent that the focus of the research on violence against women has been on the western culture, specifically, white, middle-class women (as cited in Moore, 1998). As many researchers have pointed out, the nature of the violence and attribution of the causes, blame for spousal violence and abuse in Asian families require special attention (Ho, 1990). The issue of family violence in Pakistan is highlighted these days by different NGOs (e.g., Rozen, Sach, Shirkat Gah), but there is very little proper research work available on this issue.

Due to the continuing problem of spousal violence in Pakistani society, it is important to understand factors that may influence attributions concerning domestic assaults. The present research seeks to do this by examining gender-role attitudes on domestic violence attributions. Specifically this research investigates whether victim blame and derogation increase when people having traditional gender role attitudes attribute blame for spousal violence incidence.

In two experimental conditions, attribution of blame for spousal violence would be measured using video clippings based on scenarios of spousal violence. Such scenarios have been used in various experimental studies (Moore, 1998; Valentine-French & Radtke, 1993; Walster, 1966).The results of the present study are expected to help learn the mediating role of gender role attitudes in attribution of blame for spousal violence. The use of experimental method for this study is significant as it involves direct intervention on the part of the researcher. As social behavior is complex and more than one variable cause certain effect on the given behavior. Therefore, to see the effects on attribution of blame for domestic violence, more than one variable would be taken at a time for the current study.

Objectives

The goal of the present research is to investigate the relationship between gender role attitudes and attribution of blame for spousal violence. Moreover, the research also explores the compatibility between perceived gender role attitudes of respondent and his/her attribution of blame towards spousal violence. Furthermore research also plans to meet the following objectives:

1. To develop a scale for the measurement of attribution of blame for spousal violence based on video based scenarios.
2. To find out the differences between men and women on their gender role attitudes, and attribution of blame for spousal violence.
3. To see the attribution of blame patterns under different scenarios i.e., attribution of blame in physical violence incidents, nonphysical violence incidents, man abuser scenarios, women abuser scenarios etc.

Hypotheses

To meet the objectives of the present research, following hypotheses were formulated:

1. Women will have more modern gender role attitudes than men.
2. Participants will be more likely to label the scenarios based on physical violence as 'spousal violence' than the scenarios based on nonphysical violence.
3. Participants from experimental group will assign more blame towards the victim of spousal violence as compared to control group.

Method

Research Design

The present research was completed in 3 parts. Part I of the research deals with (i) the development of questionnaire of attribution of blame for spousal violence based on video clippings, and (ii) development of statements (brief background information about the scenarios). Part II is the experiment-I (pilot study) and is concerned with the determination of reliability of the dependant measure and to see the effects of the brief background information statements on the attribution of blame. Part III is experiment-II (main study) intended to explore the relationship and effect of attribution of blame for spousal violence and gender role attitudes of married men and women. Gender differences in

attribution were also explored by categorizing participants according to traditional or modern gender role attitudes, using Gender Role Attitude Scale (Kamal & Saqib, 2004), and measuring their attribution of blame in two different experimental conditions. Dyadic Adjustment scale (Naseer, 2000) was also used to screen the participants for final analysis and only those participants were included in the final analysis that had high level of marital adjustment.

Experimental Design

This study employed 2x2x2x2 factorial design to compose 12 spousal violence video clips. The four factors examined in the study are the (1) abuser's gender (man vs woman), (2) type of the violence (physical vs non physical), (3) experimental conditions (giving background story based on gender role attitudes vs not giving any background story regarding approaching scenario), and (4) gender role attitudes (traditional vs modern). To facilitate the process of attributing blame for the study participants, the present study composed 12 "ambiguous" video clips of spousal violence incidents by including two main types of spousal violence i.e., physical violence and non physical violence (includes emotional/psychological, social and economic violence). Only sexual violence is not included in selected scenes as the judges in the phase III of Part I of the study highlighted the point of cultural limitations. They suggested not adding scenes showing sexual violence because in Pakistani society, people might have hesitation while watching those scenarios. All of the 12 clips included following four elements (1) The perpetrator and the victim are spouses (2) the perpetrator can be anyone, the husband or the wife (3) no weapon was involved, (4), clip was showing gender role attitudes.

Part I of the Research

Attribution of the blame for spousal violence was measured by using a scale based video clippings of scenarios on spousal violence. This part was completed in four phases.

Phase I: Identification of different spousal violence types

Phase II: Gathering movie clipping based on spousal violence incidents.

Phase III: Final selection of movie clippings according to their appropriateness, and development of scenario opinion questionnaire.

Phase IV: development of statements (brief background information about the scenarios so that experimental conditions would be manipulated).

Part II of the Research

Part II of the research was the experiment-I purported to see the difference between experimental and control group. A sample of 40 (20 men, 20 women) married individuals were administered the GRAS (Kamal & Saqib, 2004), and Dyadic Adjustment Scale (Naseer, 2000) along with the SVBQ. Finding revealed a significant difference between the experimental and control group confirming the effect of the background information/story of the scenarios on attribution of the blame for spousal violence.

Part III of the Research

Participants

A sample of 120 (60 men, 60 women) married participants from different areas of Rawalpindi/Islamabad, Gujar Khan, Kohat and Peshawar was selected on volunteer basis. Participants were selected by using purposive sampling technique.

Inclusion criteria. Only those participants were included who had been married for at least 3 years, had high marital adjustment, had at least one child, not used to regularly watch movies (view not more than 15 movies per year) and those who were at least matriculate. This was done to control extraneous and confounding variables like effect of previous exposure of scenarios on the participant's attribution, effect of their own marital maladjustment on their attribution of blame in spousal relationships etc.

Participants had age ranging from 20 to 62 years (M = 35.63; SD = 7.44). About 35 % participants had an education level up to F.A and remaining 65% were B.A and above. Majority of the participants did not watch movies at all (65.8%), whereas 6.7% participants watched less than 5 movies per year and only 27.5% participants watched 5 to 15 movies per year.

Measures

Gender Role Attitude Scale (GRAS). Sex Role Attitude Scale was originally developed by Kamal and Ansari in 1992 and was revised by Kamal and Saqib (2004) and the word 'sex' was also replaced with 'gender' in the title of the scale along with the other revisions of the

scale. GRAS is a 30 item scale which assesses ~~the~~ attitudes regarding roles of men and women inside and outside their homes; parental responsibilities of men and women; occupational abilities of men and women; vital life decisions; personal relationship between men and women; and level and type of academic achievement for men and women. It's a 5-point rating scale on which respondents have to express his/her degree of agreement or disagreement. Half the items are phrased in traditional manner and half in modern. Scoring for traditional items is reversed so that the high total score indicates modern views. The modern (positively phrased) item numbers are 2, 4, 6, 7, 10, 11, 12, 13, 18, 19, 20, 22, 23, 26, 27, and the traditional (negatively phrased) items numbers are: 1, 3, 5, 8, 9, 14, 15, 16, 17, 21, 24, 25, 28, 29, 30 . The reliability of the scale is reported to be .81 by the authors.

Dyadic Adjustment Scale (DAS). Dyadic Adjustment Scale was originally developed by Spanier (1976) to measure marital adjustment. It was adapted and translated into Urdu by Naseer (2000). In the present study, the adapted and translated version was used. It consists of 26 items. Item no. 1-20, 22, 23, 24, 25 were responded on a 6-point rating scale. Item no. 21 was rated on a 5 point rating scale with 0 standing for 'not at all', and 4 standing for 'in almost all'. In item no. 1-13 and 16-17, the response category 'always agree' was assigned a score of 5 and 'always disagree' was assigned a score of 0. Item no. 14, 15, 18, 19, and 20 were negative items and were reverse scored. Item no. 22, 23, 24, and 25 were scored with 5 standing for 'frequently' and 0 standing for 'never'. Item no. 26 was dichotomous with 1 standing for 'Yes' and 2 standing for 'No'. Score ranged from 1-124. High score indicate high marital adjustment. The instrument has reliability coefficients of .80 and validity is also satisfactory.

Spousal Violence Blame Questionnaire (SVBQ). Spousal Violence Blame Questionnaire which measures attribution of blame for spousal violence was developed by the researcher in part-I of this study). This scale consists of (i) 12 video based scenarios; (ii) a scenario opinion questionnaire on which questions regarding each scenario are written; and (iii) Scenario Instruction/Brief Background Information Cards

(i) Scenarios. There are 12 video based scenarios depicting spousal violence incidents (6 scenarios on physical violence, and 6 scenarios on non physical violence). The genders of the aggressor/abuser and target/victim were also varied across clippings. Husband is shown as

an abuser in 6 scenarios (3 physical violence, 3 non physical violence) while wife is shown as an abuser in remaining 6 scenarios (3 physical violence, 3 non physical violence). Duration of each movie clipping was approximately of 1 minute. Each movie clip detailed a scenario in which two individuals became involved in a domestic violence situation based on the two main types of domestic/spousal violence (i.e., physical violence, and non physical violence). This interaction culminated in one of the pair acting in an aggressive manner toward the other, either shouting at, or shouting at and then purposely bumping the other person or doing any other abusive act. Before presenting the scenario, participants of experimental group are given some written background information/story of the approaching scenario in a line or two, which was prepared in the part-I of the present study by the researcher. Participants from control group are not given any background information/story regarding the approaching scenario.

(ii) Scenario opinion questionnaire (SOQ). The present study was designed to measure the attribution of blame toward spousal violence abuser and victim. Scenario opinion questionnaire was based on 5 questions. Question no. 1 and 2 were asked to investigate the judgment of the blame towards abuser and victim and the reasons of attributing the blame. The study asked the participants who is more blameworthy on a dichotomous question with "1" standing for "Yes" and "2" standing for "No" ("In your opinion, who is to be blamed more for this incident?"), and the reasons for her/him being blamed more were asked on an open-ended question ("In your opinion, for what reasons she/she is more blameworthy"?).

Questions no. 3 and 4, a Likert type scale, measuring attribution of blame for each scenario depicting spousal violence incident include: "To what extent do you think husband should be blamed for the incident"? and "To what extent do you think wife should be blamed for the incident"? In scene No. 1, 3, 5, 7, 9, and 11, the husband was abuser and in scene No. 2, 4, 6, 8, 10, and 12, the wife was shown as an abuser. Participants were asked to indicate their opinion on a 4 point Likert scale, with response categories of 'not at all', 'to some extent', 'to great extent' and 'full blameworthy'. Scoring was done as '1' standing for 'not at all', '2' for 'to some extent', '3' for 'to great extent' and '4' for 'full blameworthy' for abuser blame and reverse scoring was done for victim blame i.e., 4 standing for 'not at all', '3' standing for 'to some extent' '3' 'for 'to great extent' and '1' for 'full blameworthy'. There were total 24

questions in 12 scenarios and score ranged from 24 to 96. High score indicate high abuser blame and low score indicate high victim blame.

Procedure

2-4 individuals in one group were administered the scales. Between participant design was used in the present study and the participants were randomly divided into two groups to assign two different experimental conditions to them. Written instructions were handed over to each group of potential participants. Half of the participants filled the Gender Role Attitude Scale (GRAS) and Dyadic Adjustment Scale (DAS) before filling the Spousal Violence Blame Questionnaire (SVBQ). The procedure was reversed for the other half people. Experimental group was given a brief background information/story card of the approaching scenario while control group was not given any information regarding the approaching scenario. The administration of all three scales took approximately 90-100 minutes to complete for most of the individuals. Once completed, packets were collected from the participants and they were ~~then~~ thanked for their cooperation.

Results

Table 1

Gender Differences on Gender Role Attitudes GRAS (N=120).

		Men (n= 60)		Women (n= 60)			
Variable	Items	*M*	*S.D*	*M*	*S.D*	t	*p*
Traditional GRA	15	39.38	9.72	38.92	8.78	.276	.783
Modern GRA	15	46.82	12.84	46.03	12.00	.345	.731
Total GRAS	30	86.20	18.49	84.95	18.35	.372	.711

Table 1 shows a non- significant difference between men and women on gender role attitudes. The results reject the hypothesis that women will have more modern gander role attitudes than men.

Table 2

Gender Differences on Attribution of Blame (N=120).

Attribution of blame	Score range	Men (*n*= 60) M	S.D	Women (n= 60) M	S.D	t	*p*
Overall blame	24-96	66.63	8.30	68.43	8.43	1.17	.24
Men abuser scenario	12-48	30.62	5.39	31.45	4.55	.91	.36
Women abuser scenario	12-48	36.02	5.04	36.98	5.63	.99	.32
Phy violence scenario	12-48	32.88	5.98	33.95	6.03	.97	.33
NPhy violence scenario	12-48	33.75	4.26	34.48	4.42	.92	.36
Phy men abuser scenarios	6-24	14.97	4.34	16.27	3.55	1.79	.08
Phy women abuser scenarios	6-24	17.92	3.56	17.68	3.24	.37	.71
Nphy men abuser	6-24	15.65	2.80	15.18	2.75	.92	.36
NPhy women abuser	6-24	18.10	3.05	19.30	3.43	2.02	.045

Note: df =118, Phy = Physical, NPsy = Non Physical,

Table 2 reveals that there is non-significant difference between men and women on attribution of blame for spousal violence scenarios expect the scenarios of nonphysical violence with women abuser, the difference between men and women is significant.

Table 3

Difference Between Experimental and Control Group on Attribution of Blame for Spousal Violence Questionnaire (N=120)

Attribution of blame	Score range	Experimental Group (*n*= 60) M	S.D	Control Group (n= 60) M	S.D	t	*p*
Overall blame	24-96	65.08	7.55	69.98	8.51	3.33	.001
Men abuser scenario	12-48	29.55	4.99	32.52	4.56	3.40	.001
Women abuser scenario	12-48	35.53	4.79	37.47	5.72	2.00	.047
Phy violence scenario	12-48	31.90	5.15	34.93	6.45	2.84	.005
NPhy violence scenario	12-48	33.18	4.20	35.05	4.30	2.40	.018
Phy men abuser scenarios	6-24	14.82	3.50	16.42	4.33	2.22	.028
Phy women abuser scenarios	6-24	17.08	3.28	18.52	3.37	2.35	.020
NPhysical men abuser	6-24	14.73	2.58	16.10	2.81	2.77	.006
NPhys women abuser	6-24	18.45	3.18	18.95	3.40	.83	.407

Note: df=118, Phy = Physical, NPsy = Non Physical,

Table 3 shows that people who were given the back ground information regarding approaching scenarios (experimental group) attributed more blame to the victim of spousal violence as compared to those who were not given any background information (control group). Finding reveals a significant difference ($p<.01$) on almost all scenarios of spousal violence except non-physical violence by women abuser. These findings confirm the hypothesis that "participants from experimental group will assign more blame to the victim as compared to control group".

Table 4

Association Between Physical and Nonphysical Violence Scenarios on the Spousal Violence Labeling

Does the Scenarios show spousal violence?	Physical violence	Non Physical violence	χ^2	p
Yes	74	22	45.15	.001
No	46	98		

Note : df=1

Table 4 shows highly significant difference on the labeling of scenarios as spousal violence on the sample. In physical violence scenarios, participants labeled the incident as violent but in nonphysical violence scenarios, they did not label it as violent. The findings revealed a great deal of disagreement and confusion about how to label the spousal violence incident. When the participants were shown scenarios based on physical violence, more participants labeled it as 'spousal violence', but when they were shown the scenarios based on nonphysical violence, less participant labeled it as spousal violence.

Discussion

In the study of gender differences on attribution of blame for spousal violence scenarios and gender role attitudes of the participants, it was assumed that women will have more medium gender role attitudes than men and will attribute significantly more blame to the abuser in spousal violence scenario as compared to men. But surprisingly, the findings rejected both of these hypotheses and revealed that there is no significant difference between men and women on GRAS and SVBQ. Even, the mean scores of GRAS indicate that neither men nor women have more egalitarian gender role attitudes, and women have slightly more traditional gender roles than men which is a very interesting finding

of the present research. In Pakistani society gender role ideology that a man should be a breadwinner and a woman should be a housekeeper exists quite obviously. In the daily life, we see that men of our society have more traditional views (typical patriarchal society) than women. It also has been supported by a number of researches (see, for example, Abouchedid, Marzillier, & Hall as cited in Salik, 2003). On the other hand, findings of the present research suggest that there is no difference between men and women on gender role attitudes which are in accord with Barbara (2003) who also found that both men and women had traditional gender role attitudes. Brien and Fassinger (as cited in Luo, 1999) pointed that women's traditional gender role attitudes may be a result of lower socio economic circumstances.

As the attribution of blame is concerned, there is no significant difference between men and women on attribution of blame for spousal violence scenarios, except the scenarios of nonphysical violence with women abuser, the difference between men and women is significant. Many studies have shown that men are more likely than women to attribute blame to both men and women victims (Kenig & Ryan, 1986; Rubin & Borgers, 1990). The findings of the present research are not consistent with previous researches. However, the slight difference between the means scores of men and women suggest that women put more blame towards abuser, and men attributed more blame to the victim of spousal violence. Burt (1980) assumed that patriarchy shapes attitudes and beliefs, women's role, men's role and their relationship to each other. So the results might be because of the patriarchal society in which we live.

As far as the role of experimental conditions is concerned, the results confirm the findings by Moore (1998) who found a significant effect of the situation (provocative vs non provocative) in which the incident of violence occurs on the attribution of blame of the participants.

Findings revealed that in physical violence scenarios, participants labeled the incident as violent but in nonphysical violence scenarios, they did not label it as violent. These findings are consistent with the research findings by Luo (1999). In our culture, people do not perceive nonphysical violence as violence as it is a part of our daily life, and has become the values and norms of our society. It may be because the word 'violence' itself is a very strong word and people only take the physical violence as violence as it has a strong manifestation. In our culture, nonphysical violence is considered as a part of the routine life and people consider it as simple day to day argument between spouses. It is

suggested that the definition of violence should be narrowed down and the word should be changed as in the present form it is very broad and people only perceive one form of spousal violence as violence.

Experimental studies usually have problems regarding external validity of its finding. This might be true for this study also, but instead of studying a representative sample, a representative sample of situations were included in the study as participants fulfilling all the criteria were included in the study to control the effect of confounding and extraneous variables making it a factorial design which brings it closer to real life settings. Therefore, we can externally validate the findings with much more confidence than a completely closed setup experiment manipulating a single factor.

With a much larger sample size than the most experimental attribution research, this study is privileged with some degree of representativeness in its findings. Nevertheless, this advantage is not without cost: the findings may be somewhat compromised by the inconsistent cell number for each experimental design. Future studies need to develop better strategies to deal with the dilemma of experimental design vs. representative sample.

The findings of the present study may not be generalizable to a variety of populations, but to make the findings externally valid, it is suggested that similar experiments be conducted using different populations, rural as well as urban, to explore their gender role attitudes and its effect on their attribution of blame for spousal violence.

The results of the present study will help learn the mediating role of our gender role attitudes in attribution of blame for spousal violence and it will be a step towards changing the researchers' attitudes towards conducting experiments and may try to remove hesitations and inhibitions regarding the use of experimental method.

Conclusion

Overall, the findings of the present research suggest that in patriarchal society like ours, neither men nor women have more modern gender role attitudes. Violence against women is endemic, and is closely linked to society's prescribed gender roles. This may be the reason that majority of the participants held the victim blameworthy instead of the abuser in a spousal violence situation. Further research is needed to fully understand the intricacies of the relationships between the victim, the abuser, and their society. If we really want to minimize the occurrence of

spousal violence, we need to understand the hidden factors which play a role of the moderator and gender role attitudes is one of them.

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Depression in Adolescents in Relation to Gender and Socioeconomic Level

Tabinda and Shazia Hasan, Ph.D
Instiutute of Clinical Psycholoy,
University of Karachi, Karachi.

The aim of the present research was to find out level of depression in relation to gender and socioeconomic level in adolescents. After literature review it was hypothesized that level of depression will be high in girls as compared to boys. Second hypothesis was that level of depression will be high in adolescents from lower socioeconomic level as compared to middle socio economic level. The matched group design was used. The sample consisted of 60 adolescents (30 boys and 30 girls) with age range from 17-20 years and educational level, intermediate to graduation. They were further divided in two groups (middle and lower socioeconomic status). The data were collected from different colleges of Karachi. Purposive sampling technique was used. After consent taking and rapport development, Reynolds's Adolescent Depression Scale (Reynolds, 2002) was administered. Girls had higher levels of depression as compared to boys hence supporting the first hypothesis. Whereas the second hypothesis was rejected, as there was no significant difference on the level of depression of adolescents belonging to middle and lower socioeconomic status respectively.

Keywords: Depression, Adolescents, Socioeconomic level.

Depression is a mental health problem which is growing very fast in general population and reported to be one of the major clinical problems of 20th century (Murphy, Monson, Olivier, 1987). It has been recommended that if this rate of depression will continue it can be the second biggest health care problem by 2020 (Üstün & Chatterji, 2001). Studies reported that 15 to 20 % adolescent population is suffering from depression (Birmaher, Ryan, Williamson, Brent, Kaufman, Dahl et al., 1996; Kessler, Avenevoli, & Merikangas, 2001; Kessler & Walters, 1998). Form of depression generally reported is moderate without

physical and psychomotor symptoms (Birmaher, 1996). Symptoms of depression in adolescents are alike adult depression but the manifestation could be varied in behavioral terms. Their depression is difficult to identify from the emotional turmoil and mood lability they are going through due to their particular developmental age (Blackman, 1996).It was further reported that these symptoms can persist and lead towards depression in later years (Lewinsohn, Rohde, Klein, Seeley 1996; Rao et al., 1995; Kessler, Avenevoli, & Merikangas, 2001).

Subgroups of adolescents who are adversely affected by depression are girls. It has been reported by researchers that girls are twice as more likely to be depressed as boys (Hasin, Goodwin, Stinson, & Grant, 2005). Psychological theories explain four factors; developmental, genetic, social and environmental as causes to develop depression. Roles assigned by the society further categorize it where the disadvantaged groups are more susceptible to develop depression. One major group is females who also lack support and financial resources which may lead towards higher levels of depression.

According to Piccinelli and Wilkinson (2001), the adverse experiences (depression and anxiety disorders) in childhood and adolescence and psychological attributes related to vulnerability to life events and coping skills are the factors related to gender differences in depressive disorders.

Gender differences in depressive disorders are genuine according to Piccinelli, Wilkinson (2001)In their research findings they mentioned that adverse experiences in Among other factors lower socioeconomic level is also measured as another feature of depressive symptoms in adolescents. Stress theories have mentioned that tangible resources which are also linked with psychological problems, it have been mentioned that socioeconomic status has an association with adult depression and also for adolescents (Eamon, 2002; Kessler, Avenevoli, & Merikangas, 2001).

Lower socioeconomic level is consistently linked with increased level of depressive symptoms and depressive disorders. Social political and economic factors are accredited as the causes of disease that effect behavior, beliefs and biology (Link & Phelan, 1995). Phillip et al. (2004) reported in their study that women reported higher levels of family stress, and scored higher on a poverty index which was significantly associated with increased reports of depressed mood than males. It was further added that family stress significantly mediated the relationship between poverty and adolescent depressed mood, explaining 50% of the total effect. Gender-specific analyses revealed that this relationship only holds

for females, and there was no direct relationship between poverty and depressed mood for males. Thus the present research aimed to investigate gender differences in depression and also compared the level of depression in two socio-economic classes.

Following hypothesis were formulated on the basis of literature review.

(1) Levels of depression will be higher in girls as compared to boys.

(2) Levels of depression will be higher in adolescents from lower socioeconomic level as compared to adolescents from middle socio economic level.

Method

Participants

The sample consisted of 60 adolescents (30 boys and 30 girls), with age ranging from 17-20 years and educational level from intermediate to graduation; they were further divided in two groups (middle and lower socioeconomic status). The data were purposively collected from different colleges of Karachi.

Measures and Procedure

Reynolds's Adolescent Depression Scale (Reynolds, 2002). It was use to measure depression in participants. It is thirty item scale which provides indication of the clinical severity of depressive symptoms in adolescents. Four factorial derived subscales include:

Dysphoric Mood (DM). Represents a primary dimension of depression referred to as a perturbation of mood including sadness, crying behavior, loneliness, irritability, worry, and self pity.

Anhedonia /Negative Affect (AN). Exemplified by a disinterest in pleasurable activities which include disinterest in having fun, engaging in pleasant activities with other students, talking with others and eating meals.

Negative self Evaluation (NS). A belief that, parents and others do not like or care about them. symptoms include low self-worth, self denigration, and thoughts of self harm. *Somatic complaints (SC):* are somatic aches, feeling ill, fatigue, sleep disturbance, boredom, and feeling mad or dissatisfied with life.

Demographic Information Form. After rapport building through initial interviewing demographic form of Institute of Clinical Psychology was administered. This form was selected to collect information about the number of family members' socioeconomic status, history of any medical or psychological illness and family psychopathology. Socioeconomic

status was determined on the basis of Household Income and Expenditure Survey by the Federal Bureau of Statistics (FBS) Government of Pakistan.

Different colleges of Karachi were selected for data collection. Initially formal permission was taken from the authorities of the colleges and then the adolescents were approached. After taking consent data were collected from them.

Results

In order to meet the objectives of the present study and to test the proposed hypothesis, scoring was done through SPSS and total score was calculated by adding individual item scores.

Table 1

Gender differences on Reyold's Adolscents' Depression Scale (N=30 for each group).

Groups	Mean	SD	df	t
Boys	68.67	14.284	58	2.43*
Girls	76.80	11.418		

Note *= $p<0.05$

Results mentioned in table 1 support the first hypothesis that girls have significantly higher levels of depression than boys.

Table 2

Comparison of levels of depression in adolescents in middle and lower socioeconomic statuses (n=30 in each group)

Groups	Mean	SD	df	t
Lower	76.00	9.837	58	1.92 (n.s)
Middle	69.47s	15.804		

Note: n.s = not significant

Table 2 shows that differences in adolescent's depression among middle and lower socioeconomic statuses was not significant thus rejecting the second hypothesis.

Table 3

Gender differences in level of depression for lower socioeconomic status group (n=30).

Groups	*Mean*	*SD*	*df*	*t*
Boys	64.00	15.892	58	1.98*
Girls	74.93	14.170		

Note: *p<.05

Table 4 shows gender differences in level of depression in low socioeconomic status class. Girls had a mean score higher on depression as compared to boys reflecting that girls had higher levels of depression as compared to boys.

Table 4

Gender differences in level of depression for middle socio-economic status class (n=30).

Groups	*Mean*	*SD*	*df*	*t*
Boys	73.33	11.108	58	1.52(n.s)
Girls	78.67	7.862		

Note: n.s = non-significant

Table 4 shows that no gender differences in levels of depression of adolescents belonging to middle socioeconomic status class.

Limitation of Study

Small sample size due to time constraint in data collection of the study and hence demand caution in generalization of the study. Another limitation of the study was that data was taken from the low and middle socio-economic status class only, therefore comparisons with higher socio-economic class was not possible and should be generalized accordingly.

Discussion

First hypothesis of the study that girls will have more depression as compared to boys showed significant mean difference. These findings indicate that girls have more depression than boys and the factors behind it could be that girls are disadvantaged group of the society. They have less control over resources, less opportunity to get well paid jobs and also very few are working on high status positions. There are other factors including early pubertal changes in girls may of the explanations of this difference, increased importance of bodily appearance, interpersonal

associations, and augmented threat for stress-inducing negative life events (Cyranowski, Frank, Young, & Shear, 2000; Nolen-Hoeksema, 2001; Siegel, 2002). In our society they are completely dependent on their immediate families. Decisions about their lives are mostly made by their significant others. They are influenced by parents for a specific role given by the society and even when they have the strengths and capabilities they are pressurized by their family members to work in that specific role which is assigned by the society or family. Peer group, schools, teachers and media also play an important role in developing gender roles, which determines the limitations for resources, mobility, education, profession and marriage (Santrock, 2003).

The Second hypothesis was about the relationship between socioeconomic level and depression in adolescents. These results showed no significant difference. Boys and girls from lower socioeconomic level and boys and girls from middle socioeconomic level have the same level of depression but when further analysis was done on the subgroups by comparing boys and girls from lower socioeconomic level and boys and girls from middle socioeconomic level, it was found out that girls from lower socioeconomic level have more depression as compared to boys from that same socioeconomic status group. Whereas, the results of girls and boys from middle socioeconomic level showed no significant difference. The analysis revealed that socioeconomic level has correlation with depression in girls from lower socioeconomic class, while girls from middle socioeconomic level experience almost the same level of depression as boys from the similar background. The results are in similar direction as has been reported by Phillip et al. (2004) in their study that depression and poverty has strong relationship with women gender and that this relationship only holds for girls, and there was no direct relationship between poverty and depressed mood for males. These results further indicate that as girls have already limited control over resources and when family is suffering from economical problems their share will be more limited. These limitations will make them more vulnerable to depression.

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The Effects of Consumer Demographics on Ethnocentricism: A Comparative Study Related to Socioecnonimcs Status, Age and Gender

Muhammad Rizwan* and Umza Ali* (Ph.D)
Instiutute of Clinical Psycholoy
University of Karachi

The purpose of the present study was to investigate the difference of consumer ethnocentric tendencies according to age, gender and socioeconomic status. The sample consisted of 180 participants: 90 men and 90 women between age range of 18 to 60 years. It was taken from different educational Institutions of Karachi. Personal information regarding participant's age, gender, marital status and socioeconomic class was collected. Consumer Ethnocentric Tendencies Scale developed by Shimp & Sharma (1987) was used to determine ethnocentric tendencies of participants. Results showed that the level of ethnocentric tendencies varied according to age and socioeconomic status. However, there was no difference with regard to gender.

Keywords: Ethnocentricism, Consumer, Socioeconomic Status, Age, Gender

Consumer ethnocentrism is derived from the more general psychological concept to ethnocentrisms. Shimp and Sharma (1987) defined consumer ethnocentrism as beliefs held by consumers about the appropriateness or morality of purchasing foreign products. Purchasing imported goods is seen as wrong as it will harm the domestic economy, have an adverse impact on domestic employment, and is unpatriotic. Basically, ethnocentric individuals tend to view their group as superior to others. As such, they view other groups from the perspective of their own, and reject those which are different while accepting those which are similar (Netemeyer, Durvasula, & Lichtenstein, 1991; Shimp & Sharma, 1987). In other words it is the level of biased preference for domestic products over foreign competitors.

Consumer ethnocentricity is supposed to be a personality trait affecting an individual's attitudes, intentions, and preferences in purchase behavior with respect to imported vs. competing domestic products. It is

usually thought of as the feeling that one's own culture is better than any other. Vida (1996) found that consumer's ethnic sentiment and national identity play an increasingly important role in a consumer's decision-making process, even in the light of the present increasing homogenization and globalization of world markets. Usually when consumers are asked directly how they feel about products from a specific country, they may express a very positive view, yet in the context of the actual purchasing, they may not act consistently with the earlier position. Han and Terpstra (1988) indicated that under normal supply/ demand conditions in the market, consumers will generally prefer domestic products, primarily due to their patriotic feelings. Likewise Shimp & Sharma (1987) regarding cross-cultural consumer behavior suggested that ethnocentric consumer may reject foreign made goods on the basis that buying foreign-made goods may hurt the domestic economy, cause unemployment, and may simply unpatriotic.

An understanding of consumer ethnocentrism provides some insights into consumer reactions to foreign products. It may also help in explaining product preferences based on country-of-origin. Ethnocentric tendencies can be helpful in estimating whether preferences to country-of-origin are productive in promotional campaigns. These tendencies may be a determinant of business success abroad and may also help in positioning products for target markets (Han & Terpstra, 1988; Parameswaran & Yaprak, 1987). Ethnocentrism can determine how companies act in towards certain cultures when conducting business.

Demographic characteristics are found to have an effect on consumer ethnocentrism. A study conducted in Slovania by Vida and Dmitrovic (2001) revealed that market segments with specific demographic characteristics e.g., older consumers with lower household income levels exhibit significantly stronger ethnocentric tendencies than the general population. In addition, it was found that a new generation of consumers has emerged, where young people have no emotional attachment to their state and a somewhat neutral attitude towards Slovenian products. Overall, these are the consumers with the lowest expressed ethnocentric tendencies who are willing to try out any international product / brand. Particularly interesting is the fact that this young educated segment of the population (when compared to the other strata of respondents) evaluated the quality and value of Slovenian products the least favorably. In view of the fact that this consumer segment represents future consumers of Slovenian brands, this result raises concern among the local marketers. As a result of this research, it

can be expected that the apparent benefit that Slovenian brands currently enjoy in relation to other international brands will shrink rapidly in the future in the younger generation.

Previous studies have also found that older individuals may have more conservative views or attitudes, which affect their import purchase behavior. For instance, Wall, Heslop and Hofsra (1988), and Shimp and Sharma (1987) have shown that in the United States consumer's ethnocentric tendencies are especially high among individuals from lower socioeconomic classes, older groups, and working classes. Socioeconomic status and income level also has an impact on how consumers feel about the importation of foreign-made products. Furthermore, cross-cultural empirical studies (Linquist, Vida, Plank, & Fairhurst, 2001; Sharma, Shimp, & Shin, 1994; Han, 1988) revealed that the more ethnocentric consumers tend to be older and with lower educational and household income levels, who work either at home or who are retired, tend to live in larger households i.e., with a greater number of children living in the household as compared to their less ethnocentric counterparts.

Researches on gender differences in ethnocentrism have suggested that gender plays an important role in the perception of "made-in" images with females having a higher country of origin bias against foreign products and in favor of domestic ones (Wall & Heslop, 1986; Lawrence, Marr, & Prendergast, 1992; Schooler, 1971). Likewise, Vida and Dmitrovic (2001) have found that that woman tend to have stronger ethnocentric tendencies as compared to males.

Researchers have previously examined the effect of demographic variables including age, gender, education, and income level on consumer ethnocentrism. In Pakistan being a developing country previously most of the products, especially those related to electronic items, vehicles, and different household items, were imported from foreign markets. Due to the economical and market demand /supply factor, it was difficult to manufacture high quality goods in Pakistan. Therefore, most of the people preferred purchasing foreign goods; but as the economy improved, higher quality products are made in Pakistan and are available in the market. This is the time when marketers have to understand consumer's attitudes and buying behavior before producing and supplying their products in the market. Now both quality foreign and local products are easily accessible in the market for consumers and marketers are facing challenges on how to cater most of the segments of the society.

Considering the present scenario, the main objective of the study was to compare the level of consumer ethnocentrism among different age groups, socioeconomic strata and gender to find out whether Pakistani men are more patriotic towards country made products; whether there is any effect of socioeconomic strata in their choice of purchase. Furthermore, the study also aimed at finding out if young people were more influenced by foreign made products as compared to the older adults. The present findings would be helpful in the field of marketing in understanding of consumer behavior.

Keeping in view the above literature review, following hypotheses were framed:

1. Younger respondents would display less level of ethnocentric tendencies as compared to the older respondents.
2. Respondents with lower house hold income would display higher level of ethnocentric tendencies.
3. Females would have higher level of ethnocentric tendencies as compared to the males.

Method

Sample

It was a purposive sample of 180 individuals, which included 90 males and 90 females. The sample of the research was taken from different educational institutions of Karachi (University of Karachi, Federal Urdu University, and Defense School of Business Administration. The age range of the participants was from 18 to 60 years, further divided into three groups 18-29 years; 30-45 years and 46-60 years with 30 females and 30 males in each sub group of age. The sample was also divided into three groups according to socioeconomic strata on the basis of household income and expenditure survey by the Federal Bureau of Statistics (FBS), Government of Pakistan (April, 2001). There were 30 females and 30 males belonging to each lower, middle and upper class.

Measures

Consumer Ethnocentric Tendencies Scale: Consumer Ethnocentric Tendencies Scale developed by Shimp and Sharma (1987) was used to measure the ethnocentric tendencies of the participants. It has 17 items and the respondents were asked to respond to these items on a 7-point Likert scale. The sum of the responses on each of the 17 items indicated the respondent's ethnocentric tendency. The author reported high

reliability (coefficient alpha ranging from .93 to .96).To use this scale on a Pakistani sample, the researchers substituted the name of the country (i.e., America to Pakistan) from all items of the scale.

Personal information. Personal information was obtained through Demographic Form that focused on the participants' age, gender, educational level, and socioeconomic class

Operational definition of variables

Lower Socioeconomic Status: Households having a monthly income of Rs. 5,000 to Rs.14, 000. This group spent their income on basic necessities, like food and clothing.

Middle Socioeconomic Status. Households having a monthly income of Rs.14, 000 to Rs.30, 000. This group spent lesser amount of expenditure on food but spends more on personal appearance and education as compared to the lower socioeconomic group.

Upper Socioeconomic Status: Households having a monthly income of Rs.30, 000 and above. This group spent more on food and also on personal appearance, education and other facilities of life, which included personal transport, residence and travel as compared to the lower and middle socioeconomic group.

Consumer ethnocentrism. It is the level of biased preference for domestic products (Pakistani made) over foreign competitors.

Procedure

After taking consent from the respondents, they were briefed about the purpose of the present research and were assured that the data would purely be used for research purposes and their identities would not be revealed to anyone. Once the rapport was established, personal information form was filled in by the participants that focused on the subject's age, gender, educational level, and socioeconomic class. Then Consumer Ethnocentric Tendencies Scale (Shimp & Sharma, 1987) was administered to measure ethnocentric Tendencies.

Result

Table 1

Descriptive Statistics of the variable of Ethnocentric Tendencies by Age (n=60)

Variables	M	SD
Early adulthood 18-29 years	83.32	16.9
Middle adulthood 30-45 years	78.25	13.36
Older adulthood 46-60 years	96.30	13.73
Total	85.9	16.55

Table 1 showing that older adults show more ethnocentric tendencies followed by those lying in the early age group and the middle age group.

Table 2

One way Analysis of Variance among respondents by Age on the variable of Consumer Ethnocentric Tendencies.

Source	df	SS	MS	F
Between Groups	2	10400.81	5200.41	23.85***
Within Groups	177	38600.83	218.08	
Total	179	49001.64		

Note: *** = p< .000

Table 2 showing Analysis of variance for consumer ethnocentric tendencies by age indicates a significant difference between three age groups regarding their consumer ethnocentric tendencies.

Table 3

Post Hoc Comparison among respondents with Age on the variable of Ethnocentric Tendencies.

Adult age Groups		Mean Difference	*p*	95% Confidence Interval	
				Lower Bound	Upper Bound
Early 18-29 years	Middle 30-45 years	5.0	.062	-.25	10.3
	Older 46-60 years	-12.98	.000	-18.30	-7.66
Middle 30-45 years	Older 46-60 years	-18.05	.000	-23.37	-12.7

Post hoc analysis indicates that level of ethnocentricism varied with respondent's age: younger respondents were significantly ethnocentric than older adults.

Table 4-6 present ANOVA results of ethnocentric tendencies by socioeconomic status class.

Table 4

ANOVA results of ethnocentric tendencies by socioeconomic status class. (n=60).

Variables	M	SD
Lower Socioeconomic Status	96.60	11.20
Middle Socioeconomic Status	86.38	16.56
Upper Socioeconomic Status	74.88	13.82
Total	85.96	16.54

Note: ***=p< .001

Post hoc analysis indicate that level of ethnocentricism varies with respondent's age as younger respondents were significantly ethnocentric than older adults.

Table 5

One way ANOVA for consumer's ethnocentric tendencies by socioeconomic status class.

Source	df	SS	MS	F
Between Groups	2	14164.8	7082.4	35.9***
Within Groups	177	34836.7	196.81	
Total	179	49001.6		

Note: ***=p< .001

Table 6

Post Hoc Comparison among respondents with lower; middle, and upper Socioeconomic Status on the variable of Ethnocentric Tendencies

Groups		Mean Difference	p	95% Confidence Interval	
				Lower Bound	Upper Bound
	Middle	10.22	.000	5.16	15.27
Lower	Upper	21.72	.000	16.66	26.77
Middle	Upper	11.50	.000	6.45	16.55

Table 7

Differences among respondents on the variable of Ethnocentric Tendencies by Gender (n=90 in each group).

Groups	M	SD	df	t	*p*
Males	86.04	17.24	178	.07	0.94
Females	85.86	15.91			

Note: P> .05

Table 6 & 7 shows a significant F-ratio for consumer's ethnocentric tendencies in three socioeconomic status classes reflects the three consumer ethnocentric tendencies in three groups are significantly different in the three socioeconomic status groups. Post hoc analysis further reflects level of ethnocentric was significantly higher in the lower socioeconomic income groups.

Discussion

Hypothesis one was supported by results which shows that level of ethnocentrism varies in accordance with the respondent's age. Younger respondents were significantly less ethnocentric than older ones. These findings seem consistent with the previous researches. Schooler (1971) had found that age was closely related with consumer ethnocentric attitudes. The younger consumers were more open toward products of foreign origin. In addition McClain and Sternquist (1991) also found that older respondents seemed to be more ethnocentric than the younger ones. The findings of the present research clearly reflected that older consumers displayed more ethnocentric tendencies, as they hold traditional values and are more likely to be more patriotic and or nationalistic than the younger generation. Furthermore younger consumers were more internationally focused which might have consequently made their attraction more towards foreign products.

Further findings seemed consistent with the second hypothesis regarding the differences in the level of ethnocentrism according to respondent's income. These findings are supported by the past researches as Usunier (1994) reported that the level of ethnocentrism was higher in lower income groupand less educated consumers. Earlier Schooler (1971) also found that lower income group is more ethnocentric as compared to higher income consumers in America. It was found that respondents with lower income had significantly higher level of ethnocentrism as compared to middle and higher income groups. Majority buys things personally and become brand loyal. They know which product is better, and they feel that Pakistani goods are qualitatively better and much cheaper than foreign made products. Consequently they become loyal to these products. These consumers feel that by purchasing Pakistani products, they indirectly increase their country's economy and give benefit to its people. On the other hand, one reason for high ethnocentric tendencies in low income group as compared to high income group can be the lack of availability of financial resources to buy foreign made goods. Some foreign made goods are expensive than home made things. High income group does not bother about the cost and use foreign products as a status symbol. Whereas, low income group cannot afford to buy them and so to keep their self-esteem high and to overcome their feelings of inferiority they rationalize in this way. As Schaefer (1997) argued that consumers with higher income had more experience with foreign products, were more willing to test internationally oriented products as compared to country made products. This may be the reason that consumers with upper socioeconomic class showed less ethnocentric tendencies as compared to consumers with lower socioeconomic class.

Furthermore it is clear from Table 7 that there is a non significant difference between male and female respondents on the level of ethnocentric tendencies. The results suggested that both male and female consumers had almost equal level of ethnocentric tendencies. It may be due to that fact that the present sample was only taken from Karachi, Pakistan, where the Pakistani culture is different. In Karachi both males and females get equal opportunities to make their decisions; and most of the females like males, actively purchase their household (grocery) and personal things. These findings seem consistent with previous researches conducted by Saleiuviene and Virvilaite (2002) who found no relationship between ethnocentrism and gender. However, Schooler (1971) reported in earlier researches that gender had also been found to predict consumer ethnocentric tendencies, although results were

somewhat mixed. Some earlier studies had found that men had more ethnocentric tendencies as compared to women, and /or they tend to favor domestic products more, which is not consistent with the present research.

Conclusion and Recommendations

It is concluded that the present focus on the consumer as seen in current business, i.e., the market orientation paradigm, advances in consumer behavior knowledge and its dynamics will continue to be crucial for both market researchers/theorists and practitioners. It is expected that the results of this research offer new insights into understanding consumer purchasing behavior in Pakistan. This type of research effort can facilitate managerial decision-making with respect to the formulation of effective long-term marketing strategies. It is recommended that marketing professionals should develop a sense of consumer ethnocentrism via electronic and print media; they need to advertise in a manner that can cater to all segments of the population; that would include both older adults, younger adults, and people from all socioeconomic classes.

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Brief Report

Neuro-imaging in Mental Health

Krishan Sony, India

Functional neuro-imaging has rapidly developed as a powerful tool in cognitive neuroscience and, in recent years, has seen widespread application of it in psychiatry. Although such studies have produced evidence for abnormal patterns of brain response in association with some pathological conditions, the core pathophysiologies remain unresolved. Although imaging techniques provide an unprecedented opportunity for investigation of physiological function of the living human brain, there are fundamental questions and assumptions which remain to be addressed. We consider the difficulties that accompany the most frequent application of these techniques—an attempt to identify responses of the brain to changing tasks or contexts—and explore how these responses are affected by psychiatric illness. These are critical issues. If these cannot be addressed, functional imaging approaches must confine their ultimate aims to diagnosis and accept that they will never clarify etiology. If the following questions remain unanswered, no matter how complex their technical advances are, the techniques will inevitably produce ambiguous findings. The questions are (1) Has the psychiatric disorder under study been appropriately specified? (2) Has the chosen task enabled a clear and unambiguous manipulation of the psychological processes that we wish to study? (3) How may we interpret changes in brain activations in the patient group?

Key words: Functional Neuro-imaging, Psychiatry, EEG, MRI, PET

Since the development of first functional brain imaging technique used in human beings by Seymour Kety in 1948, functional neuro-imaging has advanced in such a way that today it provides the crucial link between clinical features of several psychiatric disorders and their corresponding dysfunctional brain systems. By showing the various stages in the cascade from neuronal activity to behaviour, functional neuro-imaging scores over the conventional structural neuro-imaging as the latter points out only the details of structures of brain without offering any implication they have on behaviour. Functional neuro-imaging quite rightly, therefore, in considered the spearhead of a neuropsychiatric perspective.

Today functional neuro-imaging is used in research purposes. Though limited by cost, it can also be used as an important diagnostic aid. Moreover investigation like trans-cranial magnetic stimulation offers the advantage of its use as an efficacious intervention technique as well.

With the advances in technology various devices for detecting more specific functional aspects came up. Now to select a suitable mode of investigation we have plenty of options to choose from e.g. PET, SPECT, xenon enhanced CT, fMRI to detect blood flow and perfusion; MRS, PET to gain information about metabolism; SPECT & PET for ligands and neuro-receptor imaging and lastly EEG, MEG and TMS for electrophysiology.

Surprisingly, unlike the measurement of brain structure measurement of brain function has not been used much extensively in clinical practice. Its main application has been in research, though clinicians opine that alterations in brain function must at some level underlie all disorders in psychiatry. So, in the near future, it can be expected that functional neuro-imaging will gain popularity among the clinicians and will gain the status of an essential rather than optional mode of investigation.

Functional neuro-imaging techniques

Positron emission tomography (PET). PET is named from its use of positron emitting isotopes to image brain functioning. Positron emitting isotopes are very short lived radioactive entities including oxygen 15 (^{15}O), nitrogen 13 (^{13}N), carbon 11 (^{11}C), and fluorine 18 (^{18}F). The radioactive isotopes are incorporated into specific molecules to study cerebral metabolism, blood flow, and neuro-receptors. Most commonly used are, ^{15}O, water for cerebral blood flow studies or ^{18}F, flouorodeoxyglucose (FDG) to image metabolism (Berman & Weinberger, 1991; Nadeau & Crosson, 1995).

Radioactive agents are intravenously injected into the subject, whose head is positioned within a radiation detector. The radioactive isotope decays within the brain, releasing a positron. The positron travels a short distance and collides with an electron, resulting in the emission of two photons that travel at 180^0 to each other at the speed of light. The photons are detected at the opposite sides of the head simultaneously, and the location of the emitting positron can thus be calculated (Berman & Weinberger, 1991).

Advantages. PET is used extensively to understand normal brain functioning, to image neurotransmitter and their receptors and cerebral blood flow. It has greater spatial resolution than SPECT. Only PET can measure cerebral glucose metabolism. Because of shorter half life of tracer, PET studies can often be conducted multiple times in a day.

Single photon Emission computed tomography (SPECT). SPECT also uses radioactive compounds to image brain activity. Like PET, SPECT derives its name from the type of radioisotope involved, compounds that produce only one photon per disintegration. The radioisotopes are readily available from commercial sources. This makes SPECT available in most clinical centers. However, because SPECT imaging depends on a single photon being released, its spatial resolution is less than that of PET.

Advantages. It produces both quantitative and qualitative measures of cerebral blood flow. It may be beneficial in diagnosing dementing illness, and is more affordable than PET.

Functional magnetic resonance imaging (fMRI). Functional MRI couples the exquisite spatial resolution of structural MRI with the ability to image areas related to neural activity. It does this noninvasively, without the use of radioactive agents. When a localized region of brain tissue becomes active, it uses oxygen and glucose and produces certain metabolic byproducts. In these areas of increased neural activity, the metabolism and blood flow increase with the increased energy demands.

The cerebrovascular physiology of the brain is such that local blood flow and volume increases to supply the needed fuel and remove the metabolic waste products. Although the exact mechanism remains to be determined, many scientists believe that the supply of oxygen is much greater than what neurons utilize. This results in an actual increase in the concentration of oxygenated hemoglobin compared with deoxygenated hemoglobin in areas of neural activity. Oxygenated hemoglobin is less paramagnetic and has increased intensity (looks brighter) compared with deoxygenated hemoglobin on images created with T_2 weighted pulse sequences. fMRI uses this blood oxygen level dependent (BOLD) effect to image changes in neural activity (Kwong, et al., 1992). In fMRI measures of activation are always relative as they do not directly assess absolute changes in blood flow. So cognitive tests are given which serves as probes to activate specific neural network.

Advantages. Because fMRI requires no radiation and can be completely non invasive, a participant can be imaged multiple times. It also removes ethical constraints about imaging children and adolescent with psychiatric illnesses. fMRI is performed in standard, clinically available 1.5 Tesla, magnetic resonance scanner so it is a readily available mode of investigation.

Magnetic resonance spectroscopy (MRS). MRS is performed in the same scanners as structural and functional MRI. However, by altering the scanning parameters, the signal represents chemical entities from brain areas. The response of an atom in a magnetic field is characteristic, based on the number and nature of its subatomic particles, as well as its unique molecular environment. Spectra are obtained that are characteristic for nuclei within certain molecules (McClure, Kanfer, Panchalingam, Klunk, & Pettegrew, 1995). This principle is employed in MRS to study the concentration of brain metabolites. Typically, spectra are obtained from a number of nuclei, including ^{1}H, ^{13}C, ^{23}Na, ^{7}Li, and ^{31}P.

In psychiatry, investigators are primarily using ^{1}H and ^{31}P MRS. Proton (^{1}H) spectroscopy can distinguish N acetyl aspartate (NAA), creatine and phosphocreatine, and phosphatidylcholine. Signals can be obtained from glutamate, GABA, lactate, and inositol phosphates, although these signals may be difficult to adequately resolve (Narayana & Jackson, 1991). NAA is found in neurons and is absent inmost glial cell lines. Decreases in NAA may reflect a diminished number or density of neurons; NAA levels decrease proportionate to the brain loss in neurodegenerative disorders (Maier, 1995). Creatine and phosphocreatine are important energy substrates, and phosphatidylcholine is an important component of cell membranes (Narayana & Jackson, 1991).

MRS with ^{31}P detects the relative tissue concentrations of certain phosphorous metabolites, including those involved in energy and phospholipid metabolism (Waddington, O'Callaghan, Larkin, 1990). Resonances are obtained from the precursors and breakdown products of membrane phospholipids (phosphomonoesters and phosphodiesters respectively), which uncover potential abnormalities in membrane turnover. To reflect energy metabolism, ^{31}P MRS senses phosphocreatine, adenosine triphosphate, adenosine diphosphate, and inorganic orthophosphate; intracellular pH can also be assessed (Pettegrew, 1991).

Advantage. MRS is able to measure concentration of some drugs in the brain including lithium and fluoxetine.

Magnetoencephalography (MEG). Reading of brain electromagnetic activity is the basis of MEG. All electrical sources generate magnetic field. Electrical sources within the brain have been modeled as electrical dipoles consisting of assemblies of neurons oriented in tangential (i.e. parallel to the skull) or radial (i.e. perpendicular to the skull) direction. MEG utilizes a device called superconducting quantum interference device (SQUID) managetometer to detect these magnetic fields within the brain. This is a supercooled detection coil that is extremely sensitive to low intensity magnetic fields generated by dipoles within the brain.

Advantage of MEG over EEG. SQUID need not be in contact with the scalp and it is insensitive to the effects of muscle tension and activity.

- Relatively unaffected by the interposed structure like skull, scalp.
- Detects sources deep within the brain.
- Relatively unaffected by surrounding fields.
- Better temporal resolution

Electroencephalography (EEG). A method of recording graphically the electric activity of the brain, particularly the cerebral cortex, by the means of electrodes attached to the scalp. The conventional EEG parameters are obtained from averaged EEG power spectra, based on periods of time and broad fixed frequency band for a specific lead. This approach of averaging of EEG signal masks the dynamic and temporal structure of EEG, leading to complicated data interpretation.

Technical advancement of EEG equipment in the last three decades has also facilitated quantitative analysis of EEG data. Quantitative EEG, also known as neurometrics or brain mapping, is a method of paperless recording using computer-based instrumentation. There are various advantages compared to conventional EEG, including storage, acquisition, quantification, automatic spike detection, and automatic event detection. Quantitative EEG has provision for making changes in the recorded parameters, such as montage, filter.

Spectral analysis. In this technique, a series of segments (epochs) of EEG data (commonly one to four seconds in length) are processed through Fourier transformation to calculate the energy (power) in the signal that can be accounted for by a series of sinusoidal waveform of different amplitudes and frequencies. It represents state of neuronal activity in the brain.

Coherence or synchronization. It measures synchronized brain electrical activity from different region within an individual which reflects both the structural and functional connections between brain

areas. A decrease in coherence between two regions presumably indicates a decrease in their functional connection and vice-versa. Used for assessing anatomical/functional binding and metabolism in brain.

Evoked potentials (EP). In this paradigm, electrical activity is recorded while the subjects are exposed to repetitive visual (i.e. flashes of light or pattern), auditory (i.e. clicks or tones) or other stimuli (i.e. electrical stimulation of the skin). A computer averages the response to time locked, repeated stimuli, thus enhancing the signal evoked by the stimuli while averaging out other brain activity unrelated to the stimuli. The resulting display is a voltage waveform of the average response potentials. These potentials appear as a series of positive and negative waveforms occurring at specific time intervals following a stimulus and are labeled according to their polarities (P for positive, N for negative) and latencies from time of the stimulus (in milliseconds). It is used to assess rapidity and level of processing of brain.

Transcranial magnetic stimulation (TMS). TMS refers to an in vivo technique of delivering magnetic pulses to the cortex with a handheld stimulating coil, which is applied directly to the head. The equipment necessary for delivering TMS consists of two parts: a stimulator, which generates brief pulses of strong electrical currents whose frequency and intensity can be varied, and a stimulation coil connected to the stimulator. TMS stimulates the cortex focally and painlessly by creating a time-varying magnetic field. This localized pulsed magnetic field over the surface of the head induces electrical currents in the brain, which then depolarizes underlying superficial neurons.

TMS methods have been applied in a number of ways to probe the function of various aspects of the normal and abnormal brain in human subjects.

Cortical Stimulation.
Cortical and regional connectivity
Cortical plasticity
Cognition

Neuro-imaging Findings in Major Psychiatric Illnesses

Schizophrenia.

PET and SPECT studies. During the resting state. The first functional cerebral abnormality reported in older schizophrenic patients was a reduction in frontal blood flow, or hypofrontality (Ingvar &

Franzen, 1974). This finding spawned a number of studies, patient populations have ranged from acutely ill, never medicated adolescents to patients receiving long term medication. Hypofrontality is an inconsistent finding and probably depends on many factors (Berman & Weinberger, 1991, 1999; Chabrol, Guell, Bes, & Moron, 1986; Cleghorn et al., 1989; Early, Reiman, Raichle, & Spitznagel, 1987; Gur et al., 1995; Paulman, et al., 1990; Tamminga et al., 1992). In fact, some investigators find hyperfrontality in unmedicated schizophrenic patients (Ebmeier et al., 1993). Several PET studies implicate basal ganglia dysfunction in schizophrenia (Wong, et al., 1986; Liddle et al., 1992; Cleghorn et al., 1992).

During cognitive tasks. By imaging participants during the performance of tasks, cerebral activity patterns reflect a state with less variability due to random, task independent thought processes. Schizophrenic individual invariably show dysfunction within fronto-parietal- temporal networks regardless of the task used (O'Driscoll et al., 1999; Guenther et al., 1991; Cohen, Semple, Gross, & Nordahl, 1988; 1995; Carter, Mintun, Nichols, & Cohen, 1997; Gur, Jaggi, Shtasel, Ragland, & Gur, 1994; Weinberger, Berman, & Illowsky 1988; Rubin, 1991; Berman, Torrey, Daniel, & Weinberger, 1992; Andreasen, 1992).

fMRI studies. Overall studies have reported reduced limbic activation in the schizophrenia for given cognitive task (Frith et al., 1995; Honey et al., 2000).

MRS studies. ^{31}P MRS has been used to investigate membrane components and high energy phosphate compounds in the left dorsolateral prefrontal cortex of drug naive patients with first episode of schizophrenia, patients with chronic schizophrenia, and healthy control subjects. All patients with schizophrenia, whether acute, drug naive, or chronic, showed decreased levels of phosphomonoesters, the building blocks for cell membranes (Pettegrew et al., 1991; Stanley et al., 1995). However, other groups have reported increased phosphodiesters even in chronic patients (Deicken et al., 1994).

In ^{1}H MRS studies schizophrenic patients showed reduced NAA in mesial temporal lobe and dorsolateral prefrontal cortex (Buckley et al., 1994; Bertolino, Esposito et al., 2000; Delamillieure et al., 2000; Deicken et al., 2000)

EEG studies. Numerous qualitative studies indicate abnormal conventional EEG findings in 20% to 60% of schizophrenic patients (Small, 1993; Small, Milstein, Sharpley, Klapper, & Small, 1984).

Evaluation of EEG and QEEG literature on schizophrenia is complicated by the evident heterogeneity of the illness. Most often, the reported abnormalities have been delta and/or theta excesses in frontal areas (Primavera, Fonti, Novello, Roccatagliata, & Cocito, 1994; Fenton, Fenwick, Dollimore, Dunn, & Hirsch, 1980; Morihisa, Duffy, & Wyatt, 1983; Dierks, Maurer, Ihl, & Schmidtke,1989; Kemali et al., 1980; Galderisi et al, 1992) a decreased mean frequency and lower power in the alpha band (Small, Milstein, Sharpley, Klapper, & Small, 1984; Shagass, 1977; Fenton et al., 1980; Merrin & Floyd, 1992), and increased beta power (Laurian et al., 1984; Kemali et al., 1986; Karson, Coppola, & Daniel, 1988). Increased anterior coherence also has often been reported (Nagase, Okubo, Matsuura, Kojima, & Michio, 1992).

In this institute Agarwal and Nizamie (2003) found a significantly less interhemispheric gamma coherence across all brain area in schizophrenics and further Bandopadhayaya and Nizamie (2005) found more so in temporal area.

ERP Studies. The P300 ERP, a positive deflection occurring approximately 300 milliseconds after the introduction of a stimulus, is regarded as a putative biological marker of risk for schizophrenia (Bharath, Gangadhar, & Janakiramaiah, 2000; Blackwood, 2000). The P 300 amplitudes are smaller in patients with schizophrenia and is one of the most replicated electrophysiological findings (Bruder, 1999; Mccarley et al., 1997). Latency of P300 was prolonged and value was maximum in left central (C3) and frontal region in drug naïve and drug free schizophrenics (Simlai & Nizamie, 1998).

Abnormalities in the N400 amplitude in schizophrenia have been reported (Niznikiewicz et al., 1997; Nestor et al., 1997; Mathalon, Faustman, & Ford, 2000). Investigators suggest that individuals with schizophrenia do not use the context of the preceding portion of the sentence and fill in responses to phrases based on the immediately preceding word rather than the whole sentence or passage

Mood disorder.

PET and SPECT studies. Studies revealed decreased blood flow and metabolism in subgenual prefrontal cortex (SGPFC) (Drevets, Price, & Simpson 1997) in bipolar depressed patients. Whereas manic patients showed increased in SGPFC (Blumberg et al., 2000; Strakowski, 2002) and basal ganglia (**O'**Connell et al., 1995; Blumberg et al., 2000).

fMRI studies. During motor performance, manic bipolar patients had significantly higher activation in right globus pallidus compared with bipolar depressed patients (Caliguri et al., 2003). During stroop task, manic patients showed decreased right ventral prefrontal cortical activation whereas depressed patient showed an area of increased activation compared with euthymic patients (Blumberg, Leung, Skudlarski, Lacadie, Fredericks, Harris, Charney, Gore, Krystal, & Peterson, 2003). During verbal fluency task, bipolar patients had increased prefrontal cortical activation compared with healthy controls (Curtis et al., 2001). Because of wide variability of cognitive task employed comparison of fMRI studies are inevitably hampered.

MRS studies. MRS studies have reported elevated choline concentrations in the striatum of bipolar patients (Strakowski, 2002). Decreased NAA in the dorosolateral prefrontal cortex was found in, bipolar children and adolescents with parental bipolar disorder (Chang et al., 2003), in bipolar adults (Winsberg et al., 2000) and in manic patients. Davanzo et al. (2001) and Cecil et al. (2003) found a nonsignificant elevation in myo-inositol concentration in bipolar children compared with healthy subjects, suggesting that elevated myo-inositol may be a biological marker for early onset of affective disorder.

Using MRS to examine medication effect, Moore, Bebchuk et al. (1999) reported a decrease in anterior cingulated myo-inositol following lithium treatment. Lithium has also been shown to increase NAA in frontal, temporal, parietal and occipital lobes of bipolar patients, which has been interpreted to suggest that lithium may be neuroprotactive (Moore et al., 2000; Silverstone et al., 2003).

EEG studies. The incidence of abnormal conventional EEG findings in mood disorders appears to be substantial, ranging from 20% to 40% (Small, 1993; Taylor & Abrams, 1981; Cook, Shukla, & Hoff, 1986;. McElroy, Keck, Pope, & Hudson,1988) higher in 1) manic than depressed patients, 2) female than male bipolar patients, and 3) nonfamilial cases with late-age onset. EEG studies report that small sharp spikes and paroxysmal events are often found, especially on the right hemisphere (Struve, Saraf, Arko, Klein, & Becka, 1977). There is broad consensus in QEEG studies that increases in alpha or theta power, as well as asymmetry and hypocoherence in anterior regions, appear most often in unipolar depressed patients (Monakhov & Perris, 1980; Itil, 1983; Nystrom, Matousek, & Hallstrom, 1986; Knott & Lapierre, 1987; Pollock & Schneider, 1990; Nieber & Schlegel, 1992; Ramanan & Nizamie,

1997). Bipolar patients often display decreased alpha activity (Knott & Lapierre, 1987; Clementz, Sponheim, Iacono, & Beiser, 1994; Das & Nizamie, 2001) but increased beta activity (Prichep & John, 1986; John, Prichep, Fridman, & Easton, 1988; Das & Nizamie, 2001).

Together, these studies support a model of bipolar disorder that involves dysfunction within subcortical (Striatal thalamic) prefrontal networks and the associated limbic modulating regions (amygdala, midline cerebellum).

Functional imaging in personality disorder.

1. Schizotypal personality disorders. SPECT study by. Trestman, Buchsbaum, Siegel, et al. (1995) revealed greater increase in blood flow to dorsolateral prefrontal cortex (DLPFC) during cognitive task. PET studies have shown asymmetry in striatal metabolism (Siegal et al., 1994) and lower glucose metabolism in anterior cingulate (Haznedar et al., 1995). This finding suggest abnormal striated function in schizotypal personality disorder which reflect a particular form of dopaminergic dysfunction in schizophrenia spectrum illness.

2. Borderline personality disorder. Goyer et al. (1994) examined regional cerebral metabolic rates of glucose (rCMRG) in patients with personality disorder. They found higher glucose metabolism in the prefrontal cortex, lower metabolism in inferior portions of the frontal cortex, the posterior cingulated, and the left parietal area.

3. Antisocial personality disorder. A study by Intrator (1993) utilizing SPECT found that ASPD had more ventral occipital and less temporo-parietal cortical activation than normals with the affective task. Thus this study provides support for the hypothesis that ASPD respond abnormally to stimuli with aversive emotional significance.

Anxiety disorder.

1. Panic disorder. PET studies revealed abnormal asymmetry in orbito-frontal and hippocampal region (Nordahl et al., 1998; Bisaga et al., 1998). MRS studies showed increased brain lactate level in patients with panic disorder (Dager et al., 1995). Another study focusing on frontal lobe revealed phosphocreatine asymmetry with levels on the left greater than those on the right (Shioiri et al., 1996). qEEG showed paroxysmal activity in temporal lobe (Jabourian, Erlich, Desvignes, El Hadjam, & Bitton,1992).

2. Post Traumatic Stress Disorder (PTSD). Increased activity in amygdala, orbitofrontal cortex, insular cortex, anterior temporal pole and

anterior cingulated cortex was seen in subjects of PTSD in PET studies. (Rauch, et al., 1996; Shin et al., 1999). Though. Bremner et al. (1999) reported deactivation in medial prefrontal cortex in similar population.

3. Obsessive compulsive disorder (OCD).

PET studies. Major PET studies found elevated metabolism, or rCBF in the orbitofrontal cortex (Baxter et al., 1988; Swedo et al., 1989; Sawle, Hymas, Lees, & Frackowiak, 1991) or thalamus (Perani et al., 1995; Swedo et al., 1989). There was significant decrease in glucose metabolism in these areas after treatment with clomipramine (Benkelfat, et al. 1990), fluoxetine (Baxter et al., 1992) and paroxetine (Saxena et al., 1999).

SPECT studies

Baseline SPECT studies have found that patient with OCD have increased rCBF in frontal cortex (Machlin et al., 1991; Rubin, Villaneuva-Meyer, Ananth, Trajmar, & Mena, 1992) and decreased in basal ganglia specially caudate nucleus (Adams, Warneke, McEwan, & Fraser, 1989; Lucey et al., 1997). Elevated HAMPAO uptake in OCD patients decreased significantly after treatment with fluoxetine (Hoehn-Saric et al. 1991) and Clomipramine (Rubin et al., 1992).

MRS studies. Bartha et al. (1998) found significantly lower relative level of NAA in the left and right striatum of patient with OCD compared with healthy control subjects.

EEG studies. Increased theta activity has been reported in OCD (Perros et al. 1992; Silverman & Loychik 1990). Sarkar & Sinha (2004) carried out 1st QEEG study to validate fronto subcortical dysfunction hypothesis and found increase theta coherence in OCD patients as compared to normal controls.

To summarized, these studies consistently indicate elevated activity in the orbitofrontal cortex in patients with OCD, with less consistent abnormalities in the caudate nucleus which decreases with the treatment.

Substance Use Disorder

1. Alcohal

PET and SPECT studies. Alcoholics showed decreased metabolism in prefrontal, parietal and temporal cortices (Volkow et al., 1992) increased metabolism in frontal regions during detoxification (Volkow et al., 1995), andsignificantly lower benzodiazepine distribution

in frontal, anterior cingulate and cerebeller cortices (Abi-dargham et al., 1998).

MRS Studies. Measures of visibility of brain alcohol in-vivo vary widely ranging from 21% to 100% (Moxon et al., 1991; Chiu et al., 1994; Meyerhoff, Rooney, Tokumitsu,& Weiner, 1996; Petroff, Novotny, Ogino, Avison, & Prichard, 1990). NAA/Choline ratio thought to represent neuronal reserve were reduced in frontal, thalamus and cerebeller areas (Jagannathan, Desai, & Raghunathan, 1996).

EEG Studies. Among numerous QEEG studies, there is a consensus of increased beta relative power in alcoholism (Coger, & Dymond, 1979; Coger, Dymond, Serafetinides, Lowenstam,& Pearson, 1978; Bauer & Hesselbrock, 1993; Gabrielli et al., 1982; Lakra & Nizamie, 2002). ERP study suggests a frontal lobe function anomaly in alcoholics (Basu & Nizamie, 2002).

2. Cannabis

PET and SPECT Studies. Studies showed increased regional metabolism in the cerebellum during acute administration of THC, though chronic use showed increased metabolism in the orbitofrontal cortex and cingulated gyrus (Volkow et al., 1996; Mathew et al., 1997).

EEG Studies. Increased alpha power, especially in anterior regions, has been reported in withdrawal, as well as after acute exposure to cannabis (Struve, Straumanis, Patrick, & Price, 1989; Struve, Straumanis, & Patrick 1994).

3. Opiates

PET & SPECT studies. Acute intake of morphine reduced global metabolism by 10% and by about 5-15% in telencephalic areas and the cerebeller cortex (London et al., 1990). Another study revealed significant increase in regional cerebral blood flow in cingulated, orbitofrontal and medial prefrontal cortices, and caudate nuclei (Firestone et al

EEG studies. Increased alpha and decreased delta and theta have been reported in cocaine users in withdrawal Alper et al 1990; \Alper, Chabot, Prichep, Kim, & John, 1993; Cornwell, Roemer, Jackson, & Dew 1994; Prichep et al., 1996; Roemer, Cornwell, Jackson, & Dewart, 1994).

Child psychiatric disorder

1. Autism

PET and SPECT studies. Studies have shown temporal and frontal lobe hypoperfusion (Mountz, Tolbert, Lii, Katholi, & Hg 1995, 2000) and abnormal temporal cortex activation during auditory test (Muller et al., 1999; Boddaert & Zilbovicius, 2002).

fMRI studies. Increased activity in the bilateral inferior temporal gyrus, right thalamus, left superior temporal gyrus and left peristriate visual cortex has been found in subjects with autism, but not is healthy controls, when they process facial features (identity) and facial expressions (emotion) (Critchley et al., 2000; Schultz et al., 2000; Ogai et al., 2003).

Ring et al. (2002) investigated executive function in autism, found dysfunctional integration of the dorsolateral prefrontal cortex, posterior cingulated cortex and parietal cortex.

Recently, it was found that the language deficits in autism were subtended by anomalies in the dentatothalamo-prefrontal pathway and reverse dominance in the right hemisphere (Belmonte & Yureglun-Todd, 2003).

MRS Studies. Studies have found evidence of decreases synthesis and increased degradation of prefrontal cortical membranes (Minshew, Goldstein, Dombrowski, Panchalingam, & Pettegrew, 1993) and reduced concentration of N-acetyl-asparate (NAA) in the amygdala, hippocampus, cingualte, cerebellum and wernicked area (Chugani, Sundram, Behen, Lee, & Moore, 1999; Otsuka, Harada, Mori, Hisaoka, & Nishitani, 1999; Hisaoka, Harada, Nishitani, & Mori, 2001; Friedman et al., 2003) in subjects with autism.

EEG Studies. A variety of EEG abnormalities may be seen in autistic disorder, including diffused and focal spikes, paroxysmal spike and wave patterns, multifocal spike activity, and a mixed discharge. The

prevalence of EEG abnormalities in autistic disorder (in the absence of a clinical seizure disorder) ranges from 10 to 83 percent and depends on the number of recordings and the nature of the sample obtained (Volkmar, 2005).

EP Studies. Auditory brainstem evoked potentials in autistic disorder indicates no evidence of abnormalities in the auditory brainstem pathways. However, abnormalities of cognitive potentials, particularly the auditory P300 (which represents the brain's processing of sensory stimuli) have been demonstrated in autistic disorder. This presumably reflects abnormalities in higher auditory processing and neural pathways (Volkmar, 2005).

On the basis of these finding, it has been suggested that structural and biochemical abnormalities in neural network involving the fronto-tempro-parietal cortex, limbic system, and cerebellum underlie the patho-physiology of autism.

2. ADHD

PET and SPECT studies. One of the fundamental underlying dysfunction in ADHD is thought to be within the dopamine system. Doughtery et al. (1999) in a SPECT study found 70% increase in dopamine transporter density in the straitum of adults with ADHD. Another PET study by Ernst et al. (1999) showed a 48% increase of dopa accumulation in the right midbrain of children with ADHD. These studies indicate that over production of dopamine in the midbrain could be related to increased reuptake of dopamine in the stratum.

fMRI studies. . Bush et al. (1999) on testing attention in a group of adult ADHD patients found that they failed to activate the cognitive/attention division of the anterior cingulated gyrus. Similarly, Rubia et al. (1999) and Vaidya et al. (1998) have shown a failure of right prefrontal cortex activation during response inhibition paradigm in boys with ADHD vs. normal controls.

EEG studies. A large percentage of children with attention deficit problems (more than 90%) show QEEG signs of cortical dysfunction, the majority displaying frontal theta or alpha excess, hypercoherence, and a high incidence of abnormal interhemispheric asymmetry (**Marosi et al.,** 1992; Mann et al., 1992).

Dementia

Alzheimer's Disease.

SPECT studies. Studies have shown a temporoparietal hypoperfusion that is typically asymmetric (Goldenberg et al., 1989; Curran et al., 1993). Not all patients with AD show temporoparietal hypoperfusion but AD can be accompanied by a great variety of perfusion patterns, depending on cognitive findings or the severity of illness (McMurdo et al., 1994)

PET studies. Like typical hypoperfusion perfusion patterns visualized by SPECT, PET studies demonstrate a reduced cortical oxygen consumption or glucose metabolism, which is most pronounced and often asymmetrical in temporoparietal areas (Salmon, Sadzot, & Maquet, 1994).

The observed metabolic changes are correlated with test performance, the severity of illness and duration of illness (Kwa, Weinstein, Posthuymus, & Meyjes, 1993).

EEG studies. Studies show decrease of mean frequency (Brenner et al., 1986) of the dominant occipital activity of the alpha: theta ratio and an increase of relative (Coben, Danziger, & Berg, 1983) or absolute theta power, whereas delta power increases in later stages of illness (Prichep et al., 1994).

Where do we stand now?

With the advent, functional neuro-imaging raised hopes of providing the master key to unlock the even unsolved mystery of etiology of psychiatric disorders. But, in reality we are left stranded with bunch of research reports mostly reproving and strengthening earlier theories and hypothesis respectively. There is as yet no definitive and unambiguous evidence that any psychiatric brain imaging measure can provide a comprehensive and clearly incremental improvement to the existent approach to the treatment or even diagnosis of psychiatric illness. Does a pattern of imaging findings reflect a diagnostic entity or is it peculiar to a particular symptom profile? Does inconsistency within a diagnostic or symptom based grouping reflect state related psychological phenomena, or underlying etiological differences, perhaps seen at the level of the genotype? Clearly, the difficulties are highly complex and will not be addressed by any single approach to experimental design but rather by the accumulation of data sets in which the correlations of brain activity with

phenotypic and genotypic variables are examined. It has been possible, for example, to combine functional imaging with molecular genetics and developmental neurobiology. Such an approach, capitalizing on the identification of specific genetic mutations and co-occurring behavioural deficits, may offer the precision that imaging studies require. This evolving alliance along with cognitive neuroscience may in near future identifies neural networks and heralds a new era of knowledge about healthy brain function, the mechanism of disease, underlying etiology, unimagined innovations in therapeutic intervention and efficacious strategies for prevention.

Future directions

- To employ tasks on which performance of the patient and control group is matched, correlation studies should be hypothesis driven. It would be an improvement if a hypothesis are made, based on past data. For example, temporal lobe abnormality might contribute to auditory hallucination because temporal lobe epileptics experience such symptoms.
- Longitudinal investigation could help to resolve whether neuro-pathological changes are related to neuro-developmental or neuro-degenerative process, or an interaction of the two. Investigations with children and younger populations will be necessary
    - To confirm neuro-developmental theories and to demonstrate interactions with normal developmental processes.
    - To consider the need to obtain information about baseline or resting state of human brain.
    - To extend future studies beyond the receptor and neurotransmitter to look into second messenger system in the brain.
    - Application of synergistic approach i.e. using different neuro-imaging modalities complementarily to get more rewarding information to unravel the major issues in clinical neuroscience
    - To integrate regional brain activity data with knowledge of underlying pharmacological mechanisms.

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