The Journal of Social Psychology, 1997, *137*(5), 638–646

Hindi Translation of the Gray-Wilson Personality Questionnaire: A Cross-Cultural Replication of Sex Differences

PHILIP J. CORR
Department of Psychology
Goldsmiths College, University of London

VEENA KUMARI
GLENN D. WILSON
Department of Psychology
Institute of Psychiatry, University of London

ABSTRACT. The Gray-Wilson Personality Questionnaire (GWPQ) was translated into Hindi and administered to 246 male and 191 female university students. It measures six animal-learning paradigms corresponding to Gray's (1987) three-emotion systems model of personality. Sex differences previously reported from the United Kingdom and Japan were replicated: Women scored significantly higher on the Active Avoidance and Flight subscales, men on the Approach subscale. In the Indian sample, women scored higher than men on the Extinction subscale; this difference, although in the same direction, was not significant in the United Kingdom and Japan. In India, as in Japan and the United Kingdom, women were relatively punishment sensitive, and men were relatively reward sensitive. Consistent with Gray's model, scores on Fight and Flight subscales were positively correlated, as were Passive Avoidance and Extinction subscale scores; however, contrary to the model were the negative correlation between subscale scores for Approach and Active Avoidance and the positive correlation between subscale scores for Approach and Passive Avoidance, also observed previously in the United Kingdom and Japan.

THE GRAY-WILSON PERSONALITY QUESTIONNAIRE (GWPQ; Wilson, Barrett, & Gray, 1989) measures the behavioral tendencies associated with Gray's (1970, 1987, 1991) three-emotion systems model of personality. Gray (1981) has argued that this model better accounts for the factor location and causal bases of Eysenck's (1967) well-established major dimensions of personality, extraversion (E), neuroticism (N), and psychoticism (P):

1. The *behavioural inhibition system* (BIS; Gray, 1976, 1982) is the conceptual substrate for sensitivity to secondary aversive stimuli and is the proposed

causal basis of anxiety (ranging from E–/N+ to E+/N–); its associated neurology involves the septo-hippocampal system (SHS; Gray, 1982), comprising the septal area, the entorhinal cortex, the dentrate gyrus, the hippocampus, and the subicular area. Corresponding animal paradigms are *passive avoidance* (i.e., withholding a response to avoid punishment) and *extinction* (i.e., a decrease in response probability because of lack of reinforcement).

2. The *behavioural approach system* (BAS; Gray, 1987) is the conceptual substrate for sensitivity to secondary appetitive stimuli and is the proposed causal basis of impulsivity (ranging from E+/N+ to E–/N–); its associated neurology involves the basal ganglia (the dorsal and ventral striatum, the dorsal and ventral pallidum), the dopaminergic fibers that ascend from the mesencephalon (substantia nigra and nucleus A 10 in the ventral tegmental area) to innervate the basal ganglia, the thalamic nuclei closely linked to the basal ganglia, and, similarly, the neocortical areas (motor, sensorimotor, and prefrontal cortex) closely linked to the basal ganglia (Gray, 1991). Corresponding animal paradigms are *approach* (i.e., behavioral exploration in reaction to conditioned stimuli for reward) and *active avoidance* (i.e., behavioral activation in situations that signal punishment).

3. The *fight–flight system* (FFS; Gray, 1987) is the conceptual substrate for sensitivity to primary aversive stimuli and is the proposed causal basis of Eysenck's psychoticism (P) factor (Eysenck & Eysenck, 1976); its associated neurology includes the central gray of the midbrain, the ventromedial hypothalamus and the amygdala. Corresponding animal paradigms are *flight* (i.e., fleeing from unconditioned, innately painful stimuli) and *fight* (i.e., defensive, as opposed to predatory or aggressive, behavior directed to the source of unconditioned, painful stimuli).

The GWPQ provides subscales corresponding to the above animal-learning paradigms: Approach and Active Avoidance (BAS functions), Passive Avoidance and Extinction (BIS functions), and Fight and Flight (FFS functions). In this 120-item instrument, 10 items measure each scale; to reduce agreement response bias, 10 approximate logical reversals of each item were developed, increasing the number of items per scale to 20.

Despite the theoretical credential underlying the development of the GWPQ, factor analyses of the questionnaire in the United Kingdom (Wilson, Gray, & Barrett, 1990) and in Japan (Wilson, Barrett, & Iwawaki, 1995) have produced disappointing results in terms of the a priori designation of items. However, Wilson et al. (1990) stated, "We do not recommend the outright replacement of the

The Hindi Version of the GWPQ and an English version of the Hindi GWPQ are available from the authors.

Address correspondence to Philip J. Corr, Department of Psychology, Goldsmiths College, University of London, New Cross, London, SE14 6NW, United Kingdom.

original logic and scoring procedure in favour of one that is dictated by the results of factor analysis" (p. 1040) because this would violate other criteria for questionnaire construction, such as balanced direction of scoring, and would make it impossible to test hypotheses derived from Gray's theory.

In terms of comparable means and replicable sex differences, consistent results have been obtained with the a priori scales across cultures. In the United Kingdom, Wilson et al. (1989) reported that women had significantly higher scores on the Active Avoidance and Flight subscales; in addition to replicating these differences, Wilson et al. (1995) found that Japanese women scored higher on Active Avoidance subscale also. These findings suggest that the constructs measured by the GWPQ may have cross-cultural stability.

In the current study, our aims were to report on the development of a Hindi version of the GWPQ, to establish normative data, and to explore sex differences in India to test the robustness and generalizability of the effects in the United Kingdom and Japan. In addition, we compared the GWPQ with a Hindi version (Gupta, 1987; Gupta & Poddar, 1979) of the Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1964), which measures two major dimensions of personality, extraversion and neuroticism. The comparison of GWPQ and EPI scores is relevant to the rotation of Eysenck's extraversion and neuroticism scales to form anxiety and impulsivity.

Method

Translation of the Gray-Wilson Personality Questionnaire Into Hindi

First, the translation of the English version of the GWPQ into Hindi was undertaken by one of the authors (VK). It was then translated back into English by a bilingual resident of Varanasi, India. Next, this back translation was examined by another of the authors (PJC) for the psychological essence of the items. At this stage, the Hindi versions of four items were modified, translated back into English, and again rechecked; a final Hindi version of the GWPQ was then prepared. A few items involving situations not applicable to the population in Varanasi (North India) were replaced with population-relevant items.

Hindi Version of the Eysenck Personality Inventory

We used the Hindi version (Gupta, 1987; Gupta & Poddar, 1979) of the Eysenck Personality Inventory (EPI, Form A; Eysenck & Eysenck, 1964). According to Gupta (1987), "An effort was made to retain the essential content of the original English items. Particularly for items expressed in English idioms, special care was taken to translate the feeling connotations of the idioms rather than the literal meaning of individual words" (p. 15). Correlations between the English EPI and the Hindi version are $\approx .90$ (Gupta, 1987).

Participants

Two hundred forty-six men (mean age = 21.64 years, *SD* = 5.32) and 191 women (mean age = 21.67 years, *SD* = 5.53) were tested on the GWPQ and the EPI. Respondents were drawn from undergraduate and postgraduate university populations of various colleges and universities of Varanasi, North India. Most students (over 95%) were Hindu, belonging to upper-caste families (e.g., Rajputs, Brahmins, Kayasths) who are middle to upper-middle class in terms of socioeconomic status.

Procedure

We administered the questionnaires to the individual participants (10%) or to groups of 10–30 students. They received course credit for their cooperation.

Results

Except for active avoidance, which was higher in India, the GWPQ scores in this study were normally distributed and similar to norms reported from the United Kingdom and Japan. Among women, overall approach was lower, active avoidance was higher, and fight was higher than in the Japanese sample. Whether the active avoidance difference was a result of the translation of the questionnaire or of the salience of some of the situations (e.g., bad weather) is not known. Because of such vagaries, intracultural comparisons are likely to be more meaningful.

Consistent with both the United Kingdom and Japanese samples, the women in India scored significantly higher on the Active Avoidance and Flight subscales; consistent with the Japanese sample only, the Indian men scored higher on the approach subscale. Inconsistent with the Japanese sample, Indian women were not lower on Fight, a finding that parallels United Kingdom data. In a finding so far unique to India, women scored significantly higher on the Extinction subscale. However, in both the United Kingdom and Japan, women had higher extinction scores than men, but the differences failed to reach significance, possibly because of larger within-sex variations. The Indian women also scored higher on (EPI) neuroticism than the Indian men (a finding also reported for U.K. samples by Eysenck & Eysenck, 1964).

We performed various factor analyses on the GWPQ items. The resulting structures, inconsistent with the a priori designation, confirmed the research of Wilson and his colleagues (1990, 1995): The six animal-learning paradigms were not recovered by factor analysis; their further reporting here would serve no scientific purpose.

GWPQ scale alphas (see Table 1), moderate at best, were generally low. Low alphas were found also in the Japanese sample; those in the United Kingdom,

although still not impressive, were higher. It is possible that some items suffered in translation, or perhaps they were perceived differently. Such an interpretation is supported by the finding of low alphas for EPI variables also.

Contrary to our prediction, approach and active avoidance (both putatively BAS functions) were negatively correlated for both men and women; however, as predicted, passive avoidance and extinction (both putatively BIS functions) were positively correlated for both sexes. As expected, fight and flight (both putatively FFS functions) were also positively correlated (see Table 2). However, these correlations were low, and other correlations defied simple explanation. With the exception of stronger flight–flight correlations, our correlations were broadly similar to those of Wilson and his colleagues for a United Kingdom sample (1989) and for a Japanese sample (1995).

EPI extraversion was weakly correlated with GWPQ scales scores. More consistent with Gray's model, Neuroticism was positively correlated with approach, passive avoidance, and extinction; however, an unexpected negative correlation occurred with active avoidance. The lack of an effect for extraversion may be traced to extraversion's low alpha coefficents.

Discussion

The results replicated frequently reported personality differences between men and women: Men score higher than women on exploratory behavior (approach) but lower on both evasion of punishment (active avoidance) and extinction of unreinforced responses (extinction). As a corollary, women are more likely to flee painful situations (flight), less likely to approach rewarding stimuli (approach), and more likely to avoid punishment (active avoidance) and to extinguish unreinforced responses (extinction). Consistent with this general pattern, women were higher in neuroticism, a familiar outcome in investigations of sex differences (Eysenck & Eysenck, 1964). These data, broadly comparable to findings in the United Kingdom and Japan, also support the hypothesis that emotion-based behavioral tendencies are consistent across cultures. In the light of such results, Gray's three-emotion systems model of personality is cross-culturally germane to sex differences in personality.

The continuing lack of factor analytical support for the theoretical structure of the GWPQ could be interpreted as a major setback to Gray's model. However, a more parsimonious explanation is that this lack simply reflects the low internal consistency of the GWPQ scales, which, in turn, results from the broad spectrum of the responses sampled and the heterogeneous nature of the items. Perhaps, therefore, it is unsurprising that factor analysis does not reproduce the GWPQ structure. However, this conclusion raises the question of the effect of low internal reliabilities on the validity of the GWPQ model.

The GWPQ's low alpha coefficients may not be as problematic as they first appear (Wilson et al., 1989). First, alpha coefficients measure scale homogeneity

TABLE 1
Means, Standard Deviations, and Alphas for GWPQ and EPI Scales

Scale	Total sample (N = 437)			Men (n = 246)			Women (n = 191)			t	$p <$
	Alpha	M	SD	Alpha	M	SD	Alpha	M	SD		
Approach	.60	15.44	5.77	.60	16.45	5.96	.56	14.15	5.24	4.21	.001
Active Avoidance	.37	27.98	4.31	.37	27.38	4.45	.31	28.75	4.00	3.32	.001
Passive Avoidance	.36	18.20	2.94	.37	18.10	3.13	.35	18.33	2.68	.080	*ns*
Extinction	.46	19.67	3.04	.49	19.30	3.28	.36	20.16	2.65	2.95	.01
Fight	.59	18.83	3.46	.56	19.00	3.54	.63	18.61	3.50	1.16	*ns*
Flight	.61	20.08	3.48	.61	19.27	3.61	.54	21.11	3.02	5.64	.001
Extraversion	.36	12.78	2.88	.42	12.81	3.04	.26	12.74	2.66	0.22	*ns*
Neuroticism	.73	11.93	4.13	.73	11.57	4.12	.74	12.41	4.11	1.99	.05

TABLE 2
Intercorrelations of GWPQ and EPI Scales

Scale	1	2	3	4	5	6	7	8
1. Approach	1.00	−.31**	.50**	.30**	.47**	.31**	.14	.48**
2. Active Avoidance	−.24**	1.00	.10	.05	−.06	.13	−.16*	−.30**
3. Passive Avoidance	.48**	−.01	1.00	.41**	.38**	.38**	.10	.29**
4. Extinction	.24**	.15*	.54**	1.00	.25**	.37**	−.02	.28**
5. Fight	.51**	.06	.50**	.32**	1.00	.32**	.04	.31**
6. Flight	.35**	.18**	.49**	.41**	.45**	1.00	.01	.18*
7. Extraversion	.09	.03	.01	.02	.14*	.04	1.00	.23**
8. Neuroticism	.39**	−.19**	.26**	.14*	.19**	.22**	.17**	1.00

Note. Men, lower diagonal, $n = 246$; women, upper diagonal, $n = 191$.
*$p < .05$, two-tailed. **$p < .01$, two-tailed.

and are therefore highly sensitive to item redundancy. Paraphrasing items would inflate alphas without adding breadth to the scale, with a narrow and tautological factor as the result. Controversy still surrounds the appropriate interpretation of alphas: Unfortunately, the relationship between internal reliability and scale validity is not simple because low alphas do not necessarily imply low validity (Boyle, 1991; Cattell, 1978; Hattie, 1985). Nonetheless, the low alphas for EPI extraversion and the nonexistent alphas for Lie cast considerable doubt on the usefulness of these Hindi version scales in the present study.

Gray's association of anxiety and impulsivity factors with neuroticism received support, with the exception of active avoidance. Our failure to find consistent correlations with extraversion may have reflected the very low alphas for that scale. The positive correlations between the Passive Avoidance and Extinction subscales (both putatively BIS functions) and between the Fight and Flight subscales (both putatively FFS functions) support Gray's model; however, the negative correlation between the Approach and Active Avoidance subscales (both putatively BAS functions) clearly does not. In the United Kingdom and Japanese samples, the correlations between the Approach and Active Avoidance subscales were also negative, whereas those between the Approach and Passive Avoidance subscales were positive.

Further studies are needed to explore sex effects in different cultures. In translating the GWPQ into Hindi, it became apparent to us that many of the situations applicable to the United Kingdom and even to Japan are not relevant in North India (e.g., extensive use of traffic lights on roads). Therefore, translations must be sensitive to cultural differences and at the same time retain the psychological essence of the scales.

In conclusion, reactions to reward and punishment, as assessed by the GWPQ, were similar in India to those reported for the United Kingdom and Japan. Men are more sensitive to rewards and less sensitive to punishment; women are more susceptible to punishment and less susceptible to rewards. The intercorrelations of scales partly support Gray's three-emotion systems model of personality, but at the questionnaire level the intercorrelations indicate that human reactions to rewards and punishments are complex.

REFERENCES

Boyle, G. J. (1991). Does item homogeneity indicate internal consistency or item redundancy in psychometric scales? *Personality and Individual Differences, 12,* 291–294.

Cattell, R. B. (1978). *Scientific use of factor analysis in behavioural and life sciences.* New York: Plenum Press.

Eysenck, H. J. (1967). *The biological basis of personality.* Springfield, IL: Charles C. Thomas.

Eysenck, H. J., & Eysenck, S. B. G. (1964). *Eysenck Personality Inventory.* London: University of London Press.

Eysenck, H. J., & Eysenck, S. B. G. (1976). *Psychoticism as a dimension of personality.* London: Hodder and Stoughton.

Gray, J. A. (1970). The psychophysiological basis of introversion-extraversion. *Behaviour Research and Therapy, 8,* 249–266.

Gray, J. A. (1976). The behavioural inhibition system: A possible substrate for anxiety. In M. P. Feldman & A. M. Broadhurst (Eds.), *Theoretical and experimental bases of behaviour modification* (pp. 3–41). London: Wiley.

Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246–276). Berlin: Springer.

Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system.* Oxford: Oxford University Press.

Gray, J. A. (1987). *The psychology of fear and stress.* Cambridge: Cambridge University Press.

Gray, J. A. (1991). Neural systems of motivation, emotion and affect. In J. Madden (Ed.), *Neurobiology of learning, emotion and affect* (pp. 273–306). New York: Raven Press.

Gupta, B. S. (1987). Manual of the Hindi version of the Eysenck Personality Inventory. *Bhiwani: Haryana Council of Psychological Research.*

Gupta, B. S., & Poddar, M. (1979). Personality traits among Hindi-knowing Indian students. *The Journal of Social Psychology, 107,* 279–280.

Hattie, J. (1985). Methodology review: Assessing unidimensionality of tests and items. *Applied Psychological Measurement, 9,* 139–164.

Wilson, G. D., Barrett, P. T., & Gray, J. A. (1989). Human reactions to reward and punishment: A questionnaire examination of Gray's personality theory. *British Journal of Psychology, 89,* 509–515.

Wilson, G. D., Barrett, P. T., & Iwawaki, S. (1995). Japanese reactions to reward and punishment: A cross-cultural personality study. *Personality and Individual Differences, 19,* 109–112.

Wilson, G. D., Gray, J. A., & Barrett, P. T. (1990). A factor analysis of the Gray-Wilson Personality Questionnaire. *Personality and Individual Differences, 11,* 1037–1045.

Received July 1, 1996