

Do tinted spectacle lens wearers have a different personality?

F. Eperjesi BSc (Hons) PhD MCOptom DipOrth FAAO PGCertHE MHEA

Ophthalmic Research Group, School of Life and Health Sciences, Aston University, Birmingham, B7 4ET, United Kingdom.

### **Abstract**

The wearing of tinted spectacle lenses is considered by some healthcare workers to be a marker of psychopathology or hypochondriacal personality type. The purpose of this study was to determine whether there is a relationship between the wearing of tinted spectacle lenses and personality type in physically healthy subjects. A multidimensional standardized self-report inventory (Sixteen Personality Factor Questionnaire, 5th Edition) was used to determine the personality type of 98 physically healthy participants. Twenty currently wore tinted spectacle lenses for reasons other than sun protection, outdoor or indoor glare reduction or fashion. The remainder did not wear tinted spectacle lenses for any purpose other than sun protection. Tinted lens wear and no tinted lens wear groups were age and gender matched. There was no statistically significant difference in personality type between the two subject groups in terms of five global personality factors; extraversion, anxiety, tough-mindedness, independence and self-control. This suggests that the use of tinted lenses by physically healthy people is unlikely to be an indicator of personality type.

**Key words:** tinted spectacle lenses, personality type, Sixteen Personality Factor Questionnaire 5th Edition.

The wearing of tinted spectacle lenses is considered by some healthcare workers to be a marker of psychopathology (Trevor-Roper and Curran, 1984; Smyth, 1990) or hypochondriacal personality type (Howard and Valori, 1989) however, others have commented that there is very little evidence to support this proposition (Brandon, 1985; Bender, 1990; Swanson, 1990). Quinn (1990) has warned against the labeling of people who wear tinted lenses as psychoneurotic and other researchers have reported the use of tinted spectacle lenses to reduce symptoms associated with eye diseases such as blepharospasm (Grandas *et al.*, 1988).

The hypothesis that there is a relationship between wearing tinted spectacle lenses and psychopathology or personality type is based on anecdotes and old references. A literature search revealed only one rigorous study in this area. Howard and Valori (1989) used the Symptom Check List 90 (SCL 90- a self-report measure of distress and psychopathology), to demonstrate that the wearing of tinted spectacle lenses was a valid indicator of psychological distress. Their subjects were drawn from a hospital outpatient department and none had ocular problems but all had a medical condition such as diabetes or angina.

It would be useful to know if there is a relationship between the wearing of tinted spectacle lenses and personality type in physically healthy people because if the suggestion that there is a relationship between the wearing of tinted lenses and personality is incorrect, then some health care professionals may unfairly prejudice against those people who choose to wear tinted spectacles for reasons such as sun protection or

fashion. A search of the literature failed to reveal any studies that have investigated the possibility of a relationship between the wearing of tinted spectacle lenses and personality type in physically healthy people.

The aim of this study was to compare the personality type of a group of physically healthy people who wore tinted lenses for reasons other than sun protection or fashion with a group of physically healthy people who did not wear tinted spectacle lenses other than for sun protection or fashion. Comparison was by means of the Sixteen Personality Factor Questionnaire 5th Edition (16PF5), a multidimensional standardized self-report inventory.

## **Method**

### *Subjects*

Ninety-eight subjects from several university departments, e.g. lecturers and researchers (n=30), technicians e.g. electricians and laboratory assistants (n=25), administrative e.g. secretaries and personal assistants (n=20) and individuals from other sections e.g. cooks and waitresses (n=23) were recruited into the study as a sample of convenience. Individuals who had any systemic or ocular disease or wore tinted lenses for outdoor or indoor glare reduction, pattern sensitive epilepsy, migraines or reading difficulties or who were using mood-altering drugs or who did not have English as their first language were excluded from the study.

### *Materials*

Participants were asked to complete a Sixteen Personality Factor Questionnaire, 5th Edition (16PF5) (Cattell *et al.*, 1993). This is an objective test of 16 multidimensional personality attributes arranged in omnibus form that can be used by people aged 16 years and above to provide normed references. Conceptualized and initially developed by as a broad, multipurpose measure of the 'source traits' of individual personality, the 16PF5 is appropriate for a wide range of multifaceted populations (Cattell, 1970). It provides a global representation of an individual's coping style, the person's reactive stance to a fluid and transactional environment and that individual's ability to perceive accurately certain specific environmental requisites for personal behavior. The 16PF was designed to give a broad measure of personality that would be useful to practitioners in a wide range of settings such as selection for employment, counselling and clinical decision-making. The 16PF5 was chosen because: it came recommended by a colleague with a psychology background (Green M. Personal communication, 2002); it is relatively quick to complete (between 30 and 50 minutes); it is acknowledged to be a highly reliable and valid test for defining personality type (Conn and Rieke, 1994) and has been widely used (Russell and Karol, 1994) for evaluations such as personality differences between American patrolmen from different ethnic backgrounds, (Snibb *et al.* 1975) agoraphobic and non-agoraphobic families, (Mlott and Vale, 1986) and the use of different types of cognitive strategy (Kerr and Brown, 1988). The 16PF questionnaire consists of 185 multiple choice questions with a choice of one from three possible answers. A variety of topics are covered, such as attitudes towards other people, things liked doing, and feelings and reactions in a particular situation. The following is an example of a typical question: 'I'd enjoy being a counsellor more than being an architect: (a) true, (b) ?, (c) false.' Each answer has a value in terms of points. In the example given above 'a' has a value of two points, 'b' one point, and 'c' zero points. The number of points allocated to each answer depends on the specific question being

asked, i.e. for other questions answer 'a' has a value of zero, 'b' two points and 'c' one point. The last 15 questions explore reasoning ability. An example of a typical question from this section is: 'Minute is to hour as second is to: (a) minute, (b) millisecond, (c) hour.

A subject's raw score for each of the 16 primary factors is obtained through a weighted procedure where particular responses to the 185 items count summatively toward the final raw score. These sums are compared to the desired normative score in a tabular supplement where a particular 'standardised ten' (sten score) is identified based on the magnitudinal range of the response and the individual normative demographics of the respondent. This is a normalising procedure used to simplify the comparison of a subject's scores. Sten scores are based on a ten-point scale with a mean of 5.5 and a standard deviation of 1.5 and are used to express how far the raw score is from the mean. Sten scores from 4 to 7 are considered to be within the average range; scores of 1 to 3, in the low range; and scores of 8 to 10 in the high range. Each sten score is entered on a profile form and used to calculate five second order (global) factors that indicate relationships within the 16 primary factors and reflect broader personality domains. The global factors are extraversion, anxiety, tough-mindedness, independence, and self-control. The relationship between sten score and each of the global factors is presented in table 1.

### *Procedures*

This research adhered to the tenets of the Declaration of Helsinki. All participants gave informed consent to take part in the study, which was approved by the Institutional Human Ethics Committee. All participants were informed that the aim of the study was to determine if there was a relationship between tinted spectacle lenses and personality type. Each participant was given instructions as advised in the 16PF5 user manual (Cattell *et al.*, 1993) and questionnaires were left with each participant for completion in their own time and collected the following day. This is not a typical method for carrying out this type of personality analysis and it is more common for people to complete the questionnaire in the presence of an instructor. At collection, each questionnaire was reviewed and the participant encouraged to complete any unanswered questions. To encourage unbiased responses none of the participants had to give their name during the study and the research assistant that carried this part of the investigation was unknown to any of the participants. Completed questionnaires were identified by number only, during data analysis.

Each participant was then asked whether tinted spectacle lenses were currently worn for reasons other than sun protection or for fashion. Those that did wear tinted spectacle lenses for reasons other than sun protection or for fashion were recruited into the tinted spectacle lens group (tint group) and those that never wore tinted spectacle lenses or wore them only for sun protection or fashion were recruited into the no tinted spectacle lens group (no-tint group). Clinical experience suggests that the most common types of ophthalmic tint selected by individuals who are choosing tints for reasons other than sun protection are very light, light, and medium brown and very light, light, and medium grey. Therefore, six example tints were obtained with the following colours and luminous transmissions, as defined by British Standards EN 1836:1997: very light brown and very light grey (transmission >80%, filter category 0), light brown and light grey (transmission <80%, filter category 1) and medium brown and medium grey (transmission <43%, filter category 2). None of

the examples were dark enough to be mistaken for sunglasses. The tinted spectacles of those recruited to the tinted spectacle lens group were compared to the six example tints at the time of questionnaire collection or at a later date for those that did not have their spectacles available at that time, and a note made of the closest match to the sample lenses.

### **Data analysis**

Each questionnaire was assessed, raw scores entered into a template and converted into sten scores using the British General Population-Men and Women-All Ages (1322 participants in normative sample) conversion table (Smith, 1994). These sten scores were used to calculate values for five global personality factors- extraversion, anxiety, tough mindedness, independence and self-control for each participant.

### **Statistical analysis**

The five global factor scores for each participant were entered into a spreadsheet and analyzed using StatSoft, Inc. (2001), STATISTICA (data analysis software system), version 6 ([www.statsoft.com](http://www.statsoft.com)). Values such as global factor scores are very unlikely to come from normally distributed data. Therefore, a non-parametric analysis using the Mann Whitney U test was conducted.

### **Results**

Ninety-eight participants completed the personality questionnaire and 16PF5 global factors were compared between those 78 participants in the no-tint group and 20 participants in the tint group.. Six of the no-tint group and two of the tint group wore coloured contact lenses but after further questioning it was determined that the pupil portion of the lens was clear and the lenses were worn solely for fashion reasons. All individuals in the tint group were satisfied with their lenses. There was no statistically significant difference in the ages (two tailed t-test,  $t = 0.16$ , 96 df,  $p=0.87$ ) or gender ( $\chi^2 = 0.80$ , 1df,  $p>0.05$ ) for these two groups. Subject characteristics and 16PF5 results for the no-tint group are presented in table 2 and for the tint group in table 3. There was no statistically significant difference in the five global personality factors between the no-tint and tint groups: extraversion ( $p=0.31$ ), anxiety ( $p=0.75$ ), tough-mindedness ( $p=0.96$ ), independence ( $p=0.63$ ) and self-control ( $p=0.87$ ).

It was not possible to provide an estimate of the variation in global factor indices prior to data collection (no similar studies using the 16PF5 for this type of sample have been published) and therefore power calculations were not performed before the study. *Post hoc* calculations showed that the study had a statistical power of 80% i.e. there was an 80% chance of detecting a difference of four units between global indices means for each of the comparisons described. A difference of four units between means was chosen as the smallest effect of clinical interest. Global indices scores of 4 to 7 are considered to be within the average range, scores of 1 to 3 in the low range and scores of 8 to 10 in the high range and therefore, a difference in means of 3 was required to move from the lowest point in the low range (i.e. 1) to the lowest point in the average range (i.e. 4) and four to move from the lowest point in the average range (i.e. 4) to the lowest point in the high range (i.e. 8).

## **Discussion**

It has been proposed that the wearing of tinted lenses in the absence of eye disease, photophobia or photosensitivity is a marker for psychopathology or hypochondrial personality type. This proposal is based on anecdotal clinical experiences and a few reports in the literature (Trevor-Roper and Curran, 1984; Howard and Valori, 1989; Smyth, 1990). Findings from the current study indicated, that for a physically healthy sample, there was no significant difference in five global measures of personality type between those who did not wear tinted spectacle lenses and those wore tinted spectacle lenses for reasons other than sun protection. These results differ from those reported by Howard and Valori (1989) who used a different personality profiler, the SCL 90. This is a multi-dimensional test self-report inventory, which reflects psychopathology in terms of a global index of psychological distress (general severity index) and nine primary symptom dimensions-somatization, obsessive compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychotism (Derogatis *et al.*, 1976). Patients completed the inventory by recording a score from 0 to 4 depending on how much they felt each of the 90 symptoms had distressed them over the preceding month. The response to each symptom contributed to the score for one of the nine primary symptom dimensions and the General Severity Index score. The authors reported a statistically significant higher global psychological stress for 20 patients who wore tinted spectacle lenses compared to 20 age, gender and diagnosis matched controls. It is not clear how the SCL 90 and 16PF5 compare and whether it can be claimed that one is superior to the other, although the 16PF5 is a more recent test. The only symptom dimension common to both is anxiety. The differences between the two tests in that the SCL90 is provides a measure of psychological stress while the 16PF5 determines personality type and the fact that Howard and Valori's subjects all had a physical health problems such as angina or diabetes mellitus may go some way to explain the differences between the results from these two studies.

There are some limitations to the current study. It is possible the results from some subjects may have been biased by the nature of the study, an investigation into the possible relationship between wearing tinted lens and personality. However, if there was some bias it is likely to have been small, given that the participants were informed that the study was anonymous, no names were recorded at all and the research assistant collecting the data was unknown to the participants. Also, for logistical reasons the questionnaires were left with each subject for them to complete in their own time and although unlikely, it is possible that some subjects did not complete their own questionnaires.

In conclusion, within a sample of 98 physically healthy subjects, there was no difference in personality type, as measured with the 16PF5, between those who did not wear tinted spectacle lenses and those who did. This finding suggests that at least for this type of population, it is unlikely that there is a relationship between the wearing of tinted lenses and personality type.

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Table 1 Global scale descriptors for the UK version of the Sixteen Personality Factor Questionnaire, 5th Edition

Factor	Low sten score 1 to 3	High sten score 8 to 10
Extraversion	Introverted, socially inhibited	Extraverted, socially participating
Anxiety	Low anxiety, unperturbed	High anxiety, perturbable
Tough-mindedness	Receptive, open-minded	Tough-minded, resolute
Independence	Accommodating, agreeable, selfless	Independent, persuasive, wilful
Self-control	Unrestrained, follows urges	Self-controlled, inhibits urges

Table 2 Descriptive statistics for Sixteen Personality Factor Questionnaire, 5th Edition results for the no-tint group

	Extroversion	Anxiety	Tough-mindedness	Independence	Self-control
Mean score	5.0	5.2	5.2	5.1	5.3
SD	1.8	2.0	1.6	1.9	1.7
Min.	0.9	0.7	1.5	1.0	0.4
Max	9.1	9.6	9.6	8.5	8.2
No. of subjects with low score	16	16	11	23	17
No. of subjects with high score	11	13	10	12	10

Table 3 Descriptive statistics for Sixteen Personality Factor Questionnaire, 5th Edition results for the tint group

	Extroversion	Anxiety	Tough-mindedness	Independence	Self-control
Mean score	5.5	5.4	5.2	4.9	5.4
SD	1.4	1.6	1.6	1.4	1.5
Min.	3.5	1.4	0.7	1.5	3.3
Max.	8.5	7.7	7.5	7.2	8.4
No. of subjects with low score	2	3	3	2	4
No. of subjects with high score	3	3	1	1	3