PERSONAL VERSUS EXTRAPERSONAL NEGLECT: A GROUP STUDY OF THEIR DISSOCIATION USING A RELIABLE CLINICAL TEST

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ABSTRACT

The validation of a simple quantitative clinical test of personal neglect is described in this study of 17 right brain damaged CVA patients with extrapersonal neglect, 14 without unilateral extrapersonal neglect, 13 left brain damaged CVA patients and 17 age-matched controls. The test had a high reliability and clearly differentiated neglect patients from all other groups. Furthermore, the test identified a much higher incidence of personal neglect among extrapersonal neglect patients (59%) than has previously been found. Moreover, this study confirms earlier findings by showing a double dissociation between personal and extrapersonal neglect. Seven patients with extrapersonal neglect showed no personal neglect while five patients showing no extrapersonal neglect did show personal neglect on this test.

INTRODUCTION

In this paper we will discuss personal neglect and its relationship to extrapersonal neglect. Personal neglect refers to lack of exploration of half of the body contralateral to hemisphere damaged. Zingerle (1913) introduced the label personal neglect and Patterson and Zangwill (1944) showed a dissociation between personal and extrapersonal neglect. This finding was in contrast with Brain’s (1941) hypothesis of a strong association between visual neglect and a deficit of the body schema. More recently, the presence of extrapersonal and personal neglect has been established in a large group of patients (Bisiach, Perani, Vallar et al., 1986).

While the presence of disorders for different aspects of extrapersonal space is well-established, neglect for the personal space has been very little studied (Zoccolotti and Judica, 1991), and in a non-quantitative or semi-quantitative fashion. Zoccolotti and Judica devised a procedure comprising three tasks – hair combing, mock shaving (men) or facial compact use (women) and putting on spectacles. Personal neglect was assessed by an observer rating performance on each of these three tasks in terms of a four-point scale, ranging from 0 (normal performance) to 3 (severe deficit). A major problem with this scale, however, is its insensitivity to all but the most severe forms of personal neglect. In particular, the resolution of this scale is much less than that of conventional tests of extrapersonal neglect such as cancellation tasks. For this reason, it is difficult to estimate the relative incidence of personal and extrapersonal neglect.

The aims of the present paper are (i) to evaluate new procedures based on Zoccolotti and Judica’s (1991) test, which will yield more high-resolution and sensitive measures of personal neglect; (ii) to validate the clinical use of the test in different groups of brain damaged patient and (iii) to verify the possible dissociation between personal neglect and extrapersonal neglect in a group of brain damaged patients.
MATERIALS AND METHOD

Subjects

Sixty-one subjects participated in this study: 17 subjects were right brain damaged CVA patients with extrapersonal neglect; 14 were right brain damaged CVA patients without unilateral extrapersonal neglect; 13 were left brain damaged CVA patients and 17 were controls. Their demographical and clinical characteristics are summarised in Table I. There were no statistically significant differences between the four groups on any of variables summarised in Table I except for the Functional Independence Measure self-care scale score (F = 5.8; d.f. = 2, 29; p <0.007). Post-hoc tests (Fishers PLSD) only showed one significant difference in self-care, namely between the RBD Neglect group and the LBD group.

Forty-three of the CVA patients were retested, namely 15 right brain damage subjects with neglect, 16 without neglect and 12 left brain damaged subjects. All 14 brain damaged patients had a single, CT-defined, vascular lesion. The presence or the absence of extrapersonal neglect was diagnosed by means of the clinical battery reported below. Taking two of these instruments, Star Cancellation from the Behavioural Inattention Test (Wilson, Cockburn and Halligan, 1988) and Albert’s Test (Albert, 1973), Table I shows that there was barely any overlap between the neglect and non neglect groups in terms of lateralised omissions. The neglect group’s performance showed very significant neglect with only very few cases whose neglect was marginal.

Stimuli and Procedure

Extrapersonal Neglect Tests

Extrapersonal neglect was diagnosed if the patient performed in the impaired range in at least one of the following six tests (procedure and scoring gleaned from the literature were applied): line cancellation test (Albert, 1973), letter cancellation (Diller and Weinberg, 1977), star cancellation (Halligan, Cockburn and Wilson, 1991), Wundt-Jastrow illusion (Massironi, Antonucci, Pizzamiglio et al., 1988), copying of geometrical shapes (Spinnler and Tognoni, 1987) and drawing a daisy from memory. In this latter, neglect was diagnosed if the patient drew only up to 50% of the daisy.

Personal Test: Comb and Razor/Compact Task

As mentioned above, this procedure was based on Zoccolotti and Judica’s (1991) test. Part of this test was later adapted by Robertson, Hogg and McMillan (in press) to provide a more quantified measure of personal neglect. Specifically, using the hair combing task, patients were asked to comb their hair for a fixed period and the proportion of stroke made on each side of the head counted. No reliability estimates of this procedure were obtained, so in the present study the same basic procedure was standardised, and reliability assessed, for both the comb and the razor/compact (facial compact in the case of women) procedures,

TABLE I
Summary Demographic and Clinical Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Male: Female ratio</th>
<th>Age (mean, 95% CI)</th>
<th>Months post-stroke</th>
<th>Albert’s Test omissions</th>
<th>FIM Self-care (mean, 95% CI)</th>
<th>Mean left omissions on BIT star cancellation</th>
<th>Mean left omissions on Albert’s test</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBD Neglect</td>
<td>11:6</td>
<td>65.1 (10.9)</td>
<td>3.1 (1.7)</td>
<td>6.9 (9.6)</td>
<td>46.3 (12.8)</td>
<td>12.4 (10.6)</td>
<td>6.9 (9.6)</td>
</tr>
<tr>
<td>RBD No Neglect</td>
<td>11:3</td>
<td>64.4 (9.8)</td>
<td>2.7 (1.4)</td>
<td>0</td>
<td>52.8 (6.8)</td>
<td>0.5 (0.9)</td>
<td>0</td>
</tr>
<tr>
<td>LBD</td>
<td>10:3</td>
<td>63.2 (16.4)</td>
<td>2.8 (1.5)</td>
<td>0</td>
<td>61.3 (3.3)</td>
<td>1.5 (2.1)</td>
<td>0</td>
</tr>
<tr>
<td>Controls</td>
<td>9:8</td>
<td>60.9 (11.4)</td>
<td>—</td>
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as described below. The comb task was the same for both men and women. The razor task was applied to men and the make-up task to women.

The equipment consists of one comb, one razor with shield on and one powder compact. The experimenter sits opposite to the patient and holds up the combs saying: “I would like you to comb your hair, and continue combing until I tell you to stop. Do you understand that? O.K., now begin”.

The experimenter activates the stopwatch as soon as the person takes the combs, and categories each stroke of the comb according to whether it is on the left of the head, or on the right of the head or ambiguous. At the end of 30 seconds, the tester tells the patient to stop, and takes the comb from him or her. The number of strokes of the comb in each of the three categories is then recorded.

In the razor condition, which is used with men, the patient is told: “I am going to give you a razor, and I want you to pretend that you are shaving (razor with shield on). I want you to continue shaving until I tell you stop. Do you understand?” As before, timing begins as soon as the person takes the razor, and the scoring is the same format as for the comb task, namely number of stroke on the left, right and ambiguous.

In the powder compact case, which is applied to women, the instructions are equivalent to those for the razor and timing is again for 30 seconds, with number of touches of the compact on the left versus right side of the face, together with ambiguous responses being recorded.

**RESULTS**

Given that the focus of our study was left personal neglect, for both comb and razor/compact test a “left over total” percent score was calculated according to the following formula:

\[
\% \text{ left} = \frac{\text{left strokes}}{\text{left} + \text{ambiguous} + \text{right strokes}}
\]

The correlation between the score so obtained of comb and razor/compact was good enough (0.65) to allow as to combine the two individual scores according to the formula:

\[
\frac{\text{razor}\% \text{ left} + \text{comb}\% \text{ left}}{2}
\]

This combined score was used in all the following analyses as the index of left personal neglect. The test-retest reliability of the performance of the 43 subjects assessed twide proved to be the more satisfactory (0.94). Taking only these subjects who showed a significant bias (less than 0.35 on bias idex – see below) and on whom reliability data was available (n = 14), the reliability coefficient was identical, namely 0.94.

Figure 1 shows the mean score and standard deviation achieved by the four groups of experimental subjects. An ANOVA by group shows that the four samples of subjects significantly differed in their performance (F = 18.0; d.f. = 3, 57; p < .0001). A series of Fisher’s post hoc exact tests showed significant differences between all the pairs of groups, with the exception of the LBD group who did not differ significantly from the control group.

To facilitate the use of the test in a clinical setti a cut-off score of 0.35 was chosen, based on the fact that no control subjects scored less than 0.35. Table II shows the performance of each individual member of the four groups (according to the chosen cut-off).

Table II shows that 15 out of 31 (48%) right brain damaged patients performed pathologically and the majority (59%) of patients with neglect performed below the cut-off. From Table II it appear that a double dissociation emerges between personal and extrapersonal neglect. In fact, of the 14 right brain damaged patients without visual spatial extrapersonal neglect, 5 performed below the cut-off score on the personal neglect (scores = 0.26,
0.27, 0.30, 0.33 and 0.34 respectively), though it has to be said that three of the five were very close to the cut-off score and the clinical significance of this personal neglect has to be questioned. In contrast, seven patients presenting with a clear-cut clinical extrapersonal neglect scored above the normality threshold on the personal neglect test.

**DISCUSSION**

In this study we adapted a test which enables us to quantify neglect of personal space. The test is easy to administer and to score and proved to be highly reliable. Moreover it enabled us to clearly differentiate the right brain damaged group from the other patient groups and from the controls.

Of theoretical interest is the findings of a double dissociation between personal and extrapersonal neglect. Personal neglect is rare and difficult to investigate because there are only a few specific tests that one can glean from the literature. For example Bisiach et al.’s (1986) study showed a dissociation between extrapersonal and personal neglect; a patient had severe personal neglect and no problems in extrapersonal tests. The authors, in this case, defined personal neglect as an inability to discriminate the controlesional arm position.

<table>
<thead>
<tr>
<th>Subjects below and above Cut-off Score for Personal Neglect (= 0.35)</th>
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<tr>
<td>Score $&gt;$0.35</td>
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<tr>
<td>----------------</td>
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<tr>
<td>Personal neglect –</td>
</tr>
<tr>
<td>Score $&lt;$0.35</td>
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<tr>
<td>Personal neglect +</td>
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![Fig. 1 – Mean scores on Cloml and Razor/compact Test for three patient groups and controls.](image)
patient, with eyes closed, had to touch, with his left arm, the other hand. In this test it is very difficult to separate personal neglect and sensory problems – proprioceptive defect could in fact influence this performance. Another interesting case has been reported by Zoccolotti and Judica (1991). Their patient G.D.S. showed, as did Bisiach’s patient, a dissociation between personal and extrapersonal neglect, with less possibility that the personal neglect was in fact due to sensory factors.

There is in fact some controversy about the use of the term “personal neglect”. In some cases it is considered a specific impairment of the representation of the left side of the body (Willanger, Danielsen and Ankerhus, 1981; Coslett, 1989). Coslett interpreted this problem as a defect in matching perceptual information and body representation.

In the present study, we estimate an incidence of personal neglect of around 36% among right brain damaged (RBD) patients who have no neglect, though of course the sample is small and this figure must be treated with caution. Among RBD patients with neglect, the incidence is however 59%, significantly higher than those reported in studies in Italy, which estimated much lower levels of personal neglect, ranging from 20-25% (Bisiach et al., 1986; Pizzamiglio, Antonucci, Judica et al., 1992; Zoccolotti and Judica, 1991). This high incidence of personal neglect may in part explain the promising results of rehabilitation procedures whose focus is personal neglect, such as the studies on limb activation treatments for neglect (Robertson, North and Geggie, 1992). At the time of conducting these rehabilitation studies, sensitive tests of personal neglect were not available, and it is conceivable that such limb activation effects only pertain to those estimated two thirds of left extrapersonal neglect patients who also suffer from personal neglect.

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REFERENCES


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