LETTER MATCHING IN THE HEMISPHERES:
SPEED–ACCURACY TRADE-OFFS

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Abstract—Eight subjects performed physical and nominal letter-matching tasks for pairs of letters presented in the left, right, or central visual fields, using a unimanual two-choice response-time paradigm. Latencies were manipulated by using a cued response procedure, and speed-sensitivity and speed-bias functions were calculated separately for each of the peripheral visual field by response hand conditions. Hemispheric contributions to these tasks were investigated by looking for evidence of exclusive specialization and callosal transfer. The results suggest that both hemispheres are able to perform the tasks and that they do so using similar processing strategies, but that they differ in the response-choice stage of the nominal identity task.

MANY STUDIES have used lateralized versions of the letter-matching tasks of POSNER and MITCHELL [20] to investigate hemispheric specialization. Subjects are presented with pairs of letters and must decide if the members of the pair are the same or different from each other according to either a physical identity criterion (Shape task) or a nominal identity criterion (Name task). When subjects compare letters by shape, the decision is hypothesized to be done by a template-matching process that is either specialized in the right hemisphere (predicting a left visual field advantage (LVFA)) or can be done equally well by both hemispheres (predicting no visual field advantage). When subjects compare letters by nominal identity, the process is hypothesized to require phonological, or at least categorical, encoding, and to be specialized in the LH (predicting a right visual field advantage (RVFA)). However, as discussed by BOLES [5], a survey of the literature reveals inconsistent findings. Indeed, in eight studies using lateralized letter-matching tasks [1, 2, 9, 10, 12, 13, 15, 23] only two findings seem to be reported with any consistency: a RVFA for same-name decisions with latency, but not accuracy, as the dependent measure (the only study that reports accuracy results [23] found a LVFA for same-name decisions); and a LVFA for different-shape decisions with latency as the dependent measure (four out of seven studies). All the other conditions result either in no VFA or are evenly divided between right and left advantages. These discrepancies could be due to several factors, including methodological differences, use of different dependent variables, especially ones confounding sensitivity and bias, and the possible instability of the effects due to small numbers of trials and consequent vulnerability to differential strategies.

BOLES [5] systematically varied his experimental procedures in eight experiments and failed to achieve the expected RVFA for Name tasks and LVFA for Shape tasks. BOLES and EVELAND [6] proceeded to directly test the hypothesis that Name decisions require phonological coding. They hypothesized that phonological codes are evoked automatically, if evoked at all, regardless of the decision criterion used. Using both Shape and Name

decision tasks, they varied the phonological or visual confusability of their "different" pairs (e.g. AJ are phonologically confusable, AR are visually confusable). They found no effects of phonological confusability, but consistent effects of visual confusability for both tasks, and proposed a model in which Name matches give rise to a fast, automatic generation of a visual representation of both lower and upper case versions of the letters. Boles and Eveland concluded that Name decisions indeed do not involve phonological representations of the letter names. Consequently, they claim to have solved the problem presented by the lack of a consistent RVFA for the Name task in the literature. That is, they contend that since no phonological code is involved in the Name task, there is no reason to expect consistent hemispheric differences between Name and Shape tasks.

However, there are several reasons to reopen the question of hemispheric specialization for these tasks. First, there are numerous studies in the literature that have reported significant asymmetries. Second, there are several factors in the methodology used by BOLES [5] and by BOLES and EVELAND [6] that may have obscured asymmetric hemispheric participation in the decision processes. BOLES [5] required bimanual responses in six of his eight experiments, such that one hand signalled "same" and the other signalled "different". Given that each hemisphere controls the contralateral hand, this requirement may have masked, or introduced confounding, differential hemispheric processes. Boles and Eveland used unequal numbers of same and different pairs (25% same and 75% different), to the extent that their subjects evinced a very strong "different" bias (they report almost twice as many errors on "same" as on "different" stimuli). In fact, in their Shape discrimination task, the bias was so strong that their subjects do not show the ubiquitous fast-same effect. CHIARELLO et al. [8] have reported that there may be systematic hemispheric differences in response biases. They found a bias to respond "no" on LVF trials and a bias to respond "yes" on RVF trials in a lexical decision task (but see Ref. [18]). In addition, some investigators have reported a LVFA for "different" shape stimuli: COHEN [10] and EGETH and EPSTEIN [13] have even suggested that the RH is somehow specialized to perceive difference. Thus, biasing of responses may result in changed processing strategies and may have influenced the findings of Boles and Eveland, for example, by mitigating the RVFA for same-name decisions.

ZAIDEL [24, 25] has formulated several predictions that could allow us to interpret performance asymmetries in terms of hemispheric division of labor or allocation of resources, and here we have tested these directly. If one hemisphere is specialized for a given task, and all the stimuli that are presented to the other hemisphere are shuttled across the corpus callosum for processing (the Callosal Relay model), we should see evidence for callosal transfer. That is, there should be a visual field advantage and a hand advantage for the visual field and hand that are contralateral to the specialized hemisphere. These predictions rest on the finding that transfer of complex visual stimuli results in visual field advantages of 20–50 msec [4, 24]. The absence of discernible effects of callosal transfer suggests that each hemisphere is processing the stimuli presented directly to it (the Direct Access model). A positive source of evidence that contradicts the Callosal Relay model is the finding of a processing dissociation (e.g. a significant interaction between some other experimental variable and visual field of presentation). Zaidel also proposes that an interaction between response hand and visual field is positive evidence against the Callosal Relay model. These hand, visual field, and hand by visual field effects presuppose an information processing model with sequential sensory, decision and motor stages. The predictions made by such a model are supported in numerous lateralized choice response-time experiments [26].

Current models of hemispheric function predict the same outcomes for latency and for

accuracy, in the sense that "better" performance in a visual field means both shorter latencies and higher accuracies. One difficulty with this prediction is that it does not take into account the fact that humans are able to trade speed for accuracy [21]. Of the relatively few laterality studies measuring both accuracy and latency, most do not report the same effects in these dependent measures even when accuracy scores are not at ceiling or at floor. CHIARELLO [7] reports that accuracy is more sensitive to the controlled inhibition of unassociated primes in a lateralized lexical decision task, while latency is more sensitive to the automatic facilitation of related primes. HARDYCK *et al.* [16] showed that orienting attention to one visual field affected latency, but not accuracy of responses. A meta-analysis of 17 lateralized tachistoscopic experiments in our laboratory (in which neither floor nor ceiling effects in accuracy occurred) revealed that out of 44 significant effects for latency, and 50 significant effects for accuracy, only 23 were common to both dependent variables [28]. These two variables may be viewed as global measures of performance that can hide more subtle differences in functioning between the hemispheres. For this reason, the relationship between speed and accuracy might be a more informative variable than either one of these measures alone.

In the present experiment, subjects participated in two conditions: a conventional lateralized letter-matching task (the no-deadline condition), and a response deadline condition where we computed speed–accuracy trade-off functions (SATFs) for each subject in each task by response hand by visual field condition. The SATFs were calculated using d', the signal detection index of sensitivity which is bias-free as a measure of accuracy. Speed bias functions were calculated using beta, the signal detection index of bias. The speed–sensitivity functions were fitted with the equation:

$$d'_t = \lambda \{ 1 - e^{-\beta(t - \delta)} \}$$

where λ is the asymptote, β is the slope, and δ is the intercept [11]. The estimation of these parameters in this experiment was done using the least-squares method [22].

Thus, in the response-deadline condition, we have computed separate SATFs for performance in the two visual fields. These functions can differ in three parameters which can be tested as evidence for callosal transfer having taken place. A visual field advantage for the intercepts of the functions is seen as reflecting the time taken for callosal transfer. A visual field advantage in the asymptotes is a reflection of loss of information due to callosal transfer. With callosal relay, the slopes of the functions should be equal in the two visual fields, as all of the stimuli are being processed by the same hemisphere. Theoretical functions that support or contradict the Callosal Relay model are shown in Fig. 1. SATFs were also calculated for central visual field presentations. These data are relevant to the investigation of metacontrol and interhemispheric relations, and are presented and discussed elsewhere (EVIATAR and ZAIDEL, in preparation).

In summary, the goal of this study was to map out SATFs separately for letter-matching task in the two visual fields. Comparison of the parameters of these functions allowed us to be more precise in the characterization of the way the two hemispheres divide their labors in performing these tasks. We used a psychophysical design, with thousands of trials in each condition. This allowed us to look for evidence of callosal transfer in a powerful data set. Of special interest to us was the possibility of looking at the patterns of individual subjects. There may be large individual differences among subjects in the choice of a Direct Access or Callosal Relay strategy and data that are summarized over subjects may obscure the

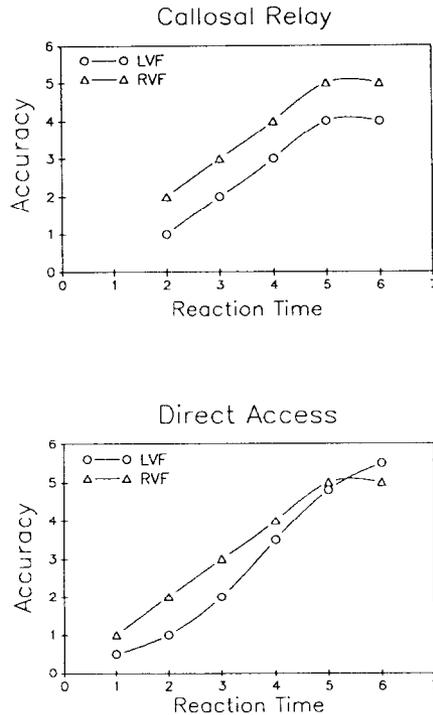## Callosal Relay

Direct Access

Fig. 1. Theoretical SATFs in the two visual fields supporting and contradicting a Callosal Relay model of the task.

individual patterns. The data of a single subject over many trials, on the other hand, may result in consistent and interpretable patterns.

METHOD

Subjects

The subjects were six graduate students and two undergraduate students (four males and four females) in the Psychology Department at UCLA. All were native English speakers and strongly right-handed. Handedness was assessed using a variant of the Edinburgh Handedness Questionnaire. Six of the subjects were paid $500.00 for their participation. Two subjects participated as volunteers.

Design and procedure

The experiment consisted of two parts: a condition in which response times were manipulated (deadlines condition) and a condition where subjects responded at will (no-deadlines condition).

Deadlines condition. Four independent variables were manipulated: the visual field (VF) to which the stimulus is flashed (left, right or central), the response time deadline (50, 100, 200, 300, 400 or 500 msec), the response hand used by the subject (left or right), and the decision type ("Name" or "Shape").

To map SATFs the cued response procedure developed by LINK [18] was used. After exposure of the stimulus, the subjects were required to wait a variable amount of time before they were cued to respond. Link has reported that the variation of a response-time deadline between trials has no systematic effect on performance. By randomly varying six deadlines it is possible to plot the sensitivity and bias of responses against the time allotted to respond, with some confidence that the subjects have not changed their processing strategy to fit the time allowed. The subjects could respond only within a specific time window, in this case, 300 msec from the cue. After exposure of the stimulus, the subjects were required to wait either 50, 100, 200, 300, 400 or 500 msec before they heard the response cue. For each latency deadline, a d' score was computed by subtracting the z-transform of the probability of responding "same" given that the stimulus pair were the same (hits), and the probability of responding "same" when the stimuli were

different (false alarms). The bias score was computed for each latency interval by taking the ratio of the height of the normal density curve for the z-transform of the hit probability to the height of the curve for the z-transform of the probability of false alarms. These ratios were transformed into logarithms. When $\log \beta = 0$, there is an equal number of misses and false alarms, and responses are not biased, when $\log \beta$ is a positive number, there are more misses than false alarms, indicating a bias to respond "different", and when $\log \beta$ is a negative number there are more false alarms than misses, indicating a bias to respond "same".

In order to have an appropriate number of trials from which to compute d' and β, the subjects completed 10 blocks of 96 trials each for a single score in the visual field by deadline conditions. The functions were computed using 10 d' and β scores for each data point. Thus, each subject ran a total of 100 blocks in each response hand by decision type condition. Each block of 96 trials contained 48 same- and 48 different-stimulus pairs. Thirty-two of each type of stimulus pair were flashed to each visual field. Within each block the order of VF and type of stimulus pair were randomly determined. The order of the latency deadlines was also randomly determined, with eight (four same, four different) trials per block for the 50 and 100 msec intervals and four trials per block for the longer deadlines.

Each subject completed five blocks of 96 trials each day, which required approximately 30–45 min. Each block was divided into two subblocks of 48 trials each, after each of which the subject was allowed to take a break. The length of these breaks was not controlled. In order to complete a condition, the subjects ran 100 "good" blocks (a "good" block was defined as one in which there were at least 14 responses to "same" stimuli within the deadline window in each condition over each group of 10 blocks). Before each response hand by decision type condition, the subjects ran a minimum of 20 practice blocks, and as many additional ones as were needed to succeed in responding within the deadline window. Thus, the subjects participated in the experiment for a period of 3–6 months. An attempt was made to have them run at approximately the same time every day, but this time changed with their schedules between academic quarters.

Each subject completed 400 experimental blocks in all (3480 trials). Type of deicision and response hand were manipulated in blocks, such that all of the specific decision type by response hand blocks were run consecutively. The order of these conditions was counterbalanced using a Latin Square across subjects.

No-deadlines condition. Four blocks of 192 trials were run with no response-time deadlines. Each block represented a decision type (Name or Shape) by response-hand condition. Within each block, 64 of the 192 trials appeared in each visual field presentation condition (LVF, RVF, central presentation). Of the 64 stimuli, 32 were "same" and 32 were "different" pairs. For each block, a d' and $\log \beta$ score was computed for each visual field presentation condition. The latencies of responses were also recorded. The subjects performed this condition over 2 days, after they had completed all the blocks in the deadlines condition. Subjects were given 2000 msec to respond, and asked to respond "as quickly and as accurately as you can". The order of presentation of decision type by response-hand conditions was the same as the one used in the deadlines condition. Before each block, the subjects performed a short (32 trials) practice block. The data collected on the first day were not used. Only the data collected from the four experimental blocks on the second day were analysed.

Materials and apparatus

The stimuli were letter pairs drawn out of the set: A, B, D, E, F, G, H, I, J. L, M, N, Q. R, T, Y, and their lower case counterparts. These letters were chosen because their upper and lower case do not have the same shape. This is to assure that "Name" decisions about stimuli such as Ee are not done via a template-matching mechanism. The stimuli were newly created for each subject for each block by a random generation of the ASCII number codes of the letter set, with the frequency of occurrence of each particular letter or letter pairing not controlled. For "Name" decisions, the generation occurred with one constraint: all of the stimuli requiring a "same" response consisted of an upper and lower case pair of the same letter (e.g. Ee). All of the stimuli requiring a "different" response consisted of two different letters, with case not controlled. For "Shape" decisions, all stimuli requiring "same" responses were the same letter, both either in upper or lower case. Two types of "different" stimuli in the "Shape" decision occurred with equal frequency: upper and lower case of the same letter (Ee) and pair of different letters (EG, Eb or ej).

The stimuli were presented by an IBM-XT personal computer using a Computerized Tachistoscope package developed by Steve Hunt. An Amdek Video-310A monitor was used, with black letters appearing on an orange background (reversed video). The pairs of letters were presented simultaneously, side-by-side in each visual field presentation condition. In order to control for the effects of acuity on the differences in performance between the central and peripheral visual fields, the peripheral stimuli were two times larger than those appearing in the center. Central visual field stimuli appeared in the center of the screen and were approximately 0.5×0.5 cm in size. Peripheral visual field stimuli subtended from 3 to 5 deg of visual angle offset from fixation and were approximately 1.0×1.0 cm in size. Viewing distance was 57.3 cm.

RESULTS

The data are presented below in the following format: first, the analyses of the estimated parameters of the SATFs calculated across all eight subjects are presented. In addition, we

analysed the individual SATFs of the subject and these data are presented separately. All of the SATF data are from the response deadline condition. Second, the relations between response hand and visual field of presentation are analysed for the no-deadlines and the response deadlines conditions.

Comparison of speed–accuracy trade-off functions

General functions. Separate analyses were done for the estimated asymptotes, slopes and intercepts of the functions in each task across all eight subjects. Task, response hand and visual field were within-group variables. The mean of the parameters are presented in Table 1.

Table 1. Mean asymptotes, slopes and intercepts of the SATFs across subjects

| | Left hand | | | Right hand | | |
	Asymptote (d')	Slope (d'/msec)	Intercept (msec)	Asymptote (d')	Slope (d'/msec)	Intercept (msec)
Name task						
LVF	5.4	0.0061	273	4.9	0.0065	263
RVF	4.8	0.0065	266	5.4	0.0060	255
Shape task						
LVF	4.7	0.0082	256	4.8	0.0078	238
RVF	4.0	0.0084	253	4.5	0.0080	250

There were no significant effects for estimated asymptotes and intercepts. For the slopes of the functions, only a main effect of task was found, $F(1, 7) = 10.4$, $P = 0.014$. The slope for the Shape task (0.0081) is steeper than the slope for the Name task (0.00627). That is, as more time was given for responding, performance in the Shape task improved more quickly than performance on the Name task. The functions are illustrated in Fig. 2.

Figure 3 presents the response-bias patterns in the lateralized deadline conditions for both the Name and Shape tasks summarized across subjects. The mean log β scores were analysed separately for each task, with response deadline, visual field and response hand as within-group variables. For the Name task, the analysis revealed a significant response hand by visual field interaction, $F(1, 7) = 8.8$, $P = 0.02$. Planned comparisons show that in the LVF there is a significant difference between left and right hand responses (log $\beta = 0.1$ vs -0.103, respectively), $F(1, 7) = 9.23$, $P = 0.018$, and no such effect in the RVF (mean log $\beta = -0.15$ with the left hand vs -0.104 with the right hand). For the Shape task there are no significant effects.

Individual functions. The SATFs for each subject for each condition were computed. Each of the points in the function is a mean of 10 d's, each of which was calculated from approximately 20 same and 20 different pairs. The estimated parameters of the functions (intercept, slope, asymptote) were each analysed separately with task as a between-group variable, and visual field and response hand as within-group variables. Four of the eight subjects reveal significant effects of visual field of presentation. Table 2 presents a summary of these effects.
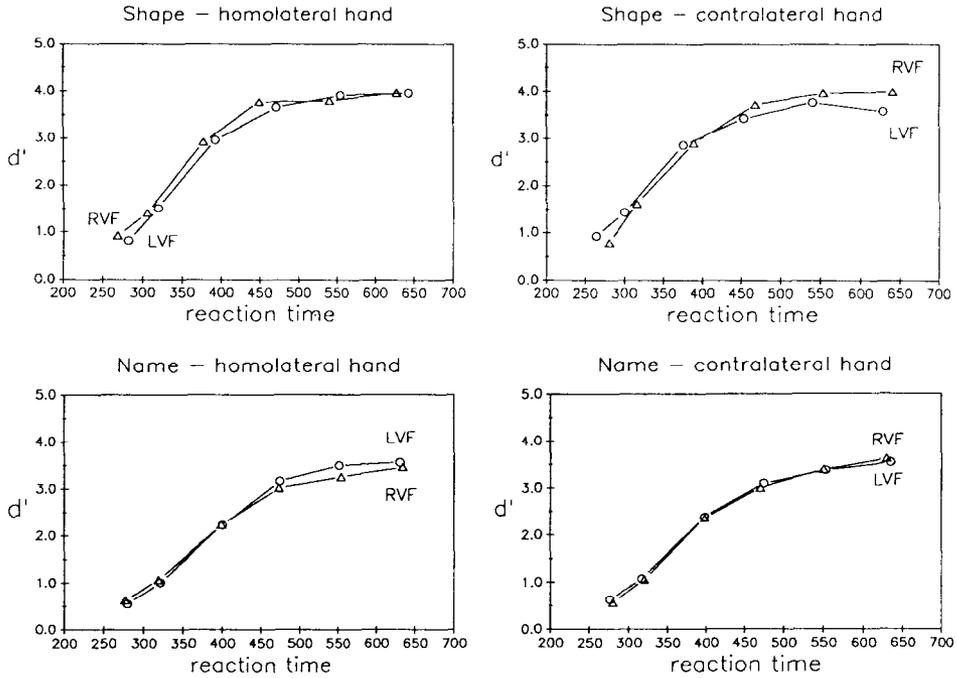
Fig. 2. Sensitivity functions in the visual field—response hand conditions. Homolateral hand: LVF—left hand, RVF—right hand; contralateral hand: LVF—right hand, RVF—left hand.
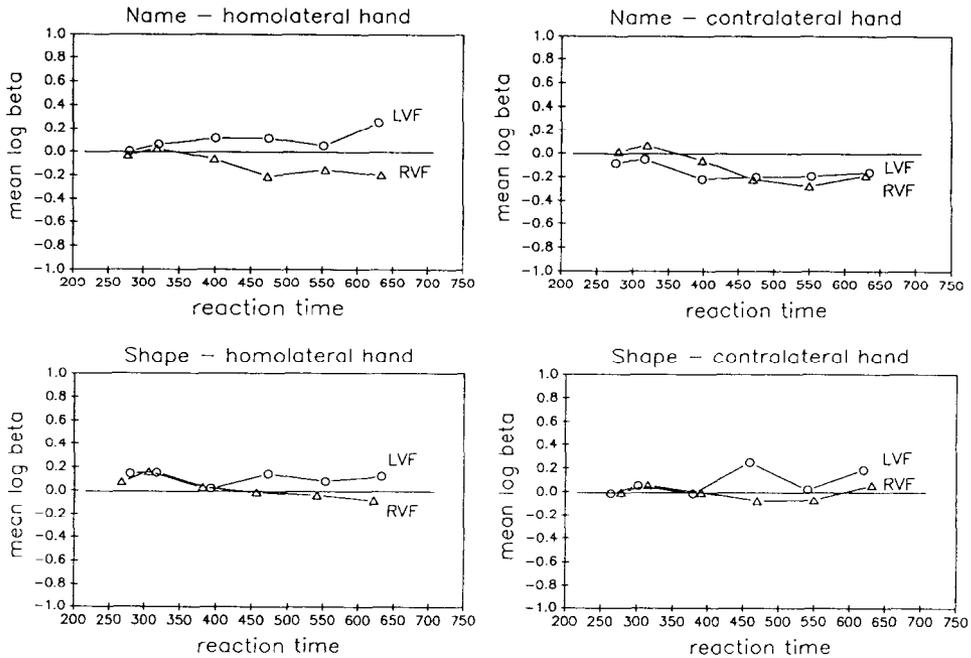

Fig. 3. Speed–bias functions in the visual field- response hand conditions.

Table 2. Summary of statistical effects of response hand and visual field on the parameters of SATFs of individual subjects

Subject	Intercepts	Slopes	Asymptotes
H.B.	LVFA for both tasks	VF X response hand interaction: contralateral hand advantage for both tasks	No effects
L.D.	VF X response hand interaction: contralateral hand advantage in RVF	No effects	No effects
T.G.	LVFA for Shape task RVFA for Name task	RVFA for both tasks	No effects
B.S.	RVFA for Name task VF X response hand interaction for Shape task: contralateral hand advantage	No effects	No effects

Hand by visual field relations

No-deadlines condition. Figure 4 presents the patterns of the eight subjects performing the tasks with no deadlines. The subjects were asked to respond as quickly and as accurately as they could. Sensitivity scores (d') are illustrated in the two top panels, and bias scores are shown in the bottom panels.
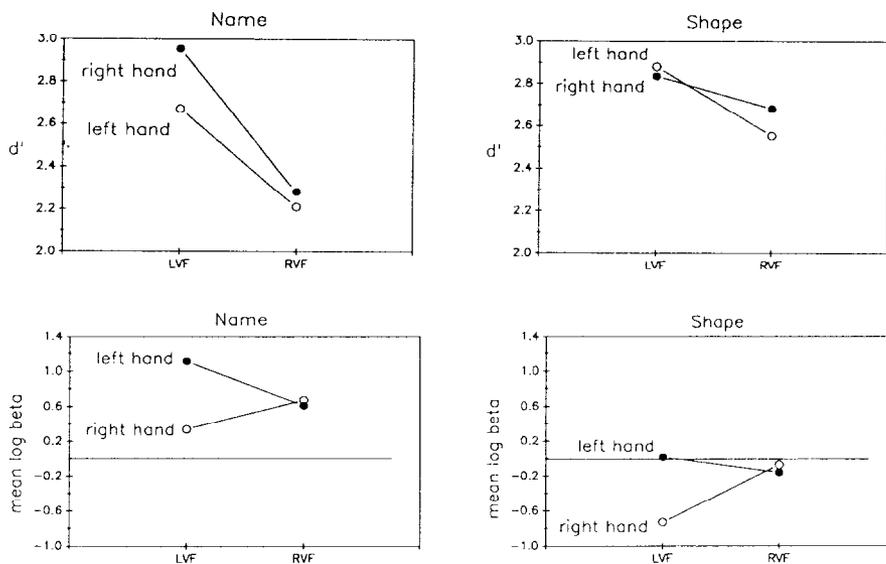

Fig. 4. Sensitivity (d') and bias (log β) scores from the no-deadlines condition.

The d' scores were analysed with an analysis of variance using task, response hand, and visual field as within-group variables. None of the patterns shown in the figure are statistically significant.

The bias patterns were analysed with task, visual field, and response hand as within-group

variables. Only the main effect of task is significant, $F(1,7) = 19.42$, $P = 0.004$. In the Name task, bias is in the direction to say "different" (mean $\log \beta = 0.682$), and this is significantly different from 0, $F(1, 7) = 20.5$, $P = 0.003$. For the Shape task, there is a slight bias to say "same" (mean $\log \beta = -0.237$), but this is not significantly different from 0, $P > 0.1$.

Response deadlines condition. In order to look for consistent patterns within the data of individual subjects, the hand by visual field data were analysed separately for each subject. For each task, we tested the simple effects of response hand, of visual field, and the response hand by visual field interaction at each response deadline. These effects are summarized in Table 3. In general, the modal pattern is one showing no effects.

Table 3. Response hand and visual field effects in the response deadline windows
(n.s. = no effects, LhA = left hand advantage. RhA = right hand advantage,
HA = homolateral hand advantage)

Subject		Deadline window (msec)					
		50	100	200	300	400	500
T.G.	Name:	n.s.	LhA	LhA	LhA	LhA	LhA
	Shape:	n.s.	n.s.	LhA	LhA	LhA	n.s.
B.P.	Name:	n.s.	n.s.	RhA	n.s.	RhA	n.s.
	Shape:	RhA	n.s.	n.s.	n.s.	n.s.	n.s.
B.S.	Name:	HA	n.s.	n.s.	n.s.	n.s.	n.s.
	Shape:	n.s.	n.s.	n.s.	n.s.	HA	n.s.
J.C.	Name:	RhA	n.s.	n.s.	n.s.	n.s.	n.s.
	Shape:	RhA	n.s.	n.s.	n.s.	n.s.	n.s.
L.D.	Name:	HA	n.s.	n.s.	n.s.	n.s.	n.s
	Shape:	LhA	LhA	HA	n.s.	n.s.	n.s.
H.B.	Name:	n.s.	LhA	n.s.	n.s.	LhA	n.s.
	Shape:	n.s.	LhA	LhA	LhA	LhA	n.s.
A.Y.	Name:	HA	n.s.	n.s.	n.s.	n.s.	n.s.
	Shape:	n.s.	LhA	LhA	n.s.	LhA	n.s.
A.M.	Name:	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	Shape:	n.s.	n.s.	n.s.	HA	RhA	n.s.

DISCUSSION

This experiment had two goals: (1) to attempt to clarify the lateralization status of letter-matching tasks by mapping SATFs separately in each visual field condition; and (2) to look for evidence supporting a Callosal Relay (CR) account of the hemispheric allocation of labor in these tasks.

Computation of the SATFs revealed two interesting effects. First, our finding that the SATFs in the two visual fields are identical across subjects is consistent with BOLES' [5] failure to find hemispheric differences. Thus, there is no evidence that the hemispheres differ in their abilities to perform the tasks. Second, the analyses of the individual subjects' SATFs reveal individual differences, and no consistent patterns across subjects. Assuming that callosal relay must result in discernible consequences (either in accuracy or in latency), these data contradict the CR model.

The analyses of the individual SATFs reveal a few interesting individual differences. Of the

four subjects that show significant effects, two (H.B. and T.G.) show patterns contradicting the CR and supporting a Direct Access model for both tasks, together with indications of different hemispheric abilities. Both subjects show effects of visual field of presentation (interacting with response hand for H.B.) on the slopes of their functions, suggesting that different processors performed the tasks in the two visual fields. H.B. also shows a general LVFA in the intercepts of her functions, suggesting greater RH than LH sensitivity for both tasks. T.G. shows an interaction between task and visual field in his intercepts, suggesting that his RH is more sensitive in the Shape task and that his LH is more sensitive in the Name task. B.S. and L.D. show significant effects only in the intercepts of their functions. L.D.'s pattern, although it is a significant hand by visual field interaction, is not readily interpretable. B.S.'s pattern, a three-way interaction between task, visual field and response hand, supports a CR account of his performance on the Name task (with the LH being dominant), and a DA account of his performance on the Shape task. These data show that stable individual differences exist, even in the performance of such seemingly simple tasks, and that SATFs may be a useful way to study these differences.

The bias measures reveal two interesting phenomena. First, in the no-deadlines condition, the Name task resulted in a significant bias to respond "different" and the Shape task did not. Second, although the interaction in the no-deadlines condition is not siginificant, Fig. 4 shows that here, as well as in the response deadlines condition, the strongest response bias in the Name task occurs in the LVF-left hand condition. This is interesting because that is the only condition in which it is theoretically possible for the RH to have performed the task independently. Here, there is no need for LH participation, as in initially receiving the stimuli (RVF-left hand trials) or in controlling the response hand (LVF-right hand trials). This finding supports the DA account as well as BOLES' [5] and BOLES and EVELAND's [6] contention that both hemispheres are able to perform the name task. In this case, the similarity between the SATFs in the two visual fields is evidence that the hemispheres process the tasks in generally similar ways. At the same time, the bias differences suggest that the hemispheres do use different strategies, because we have a processing dissociation between type of response bias ("same" or "different") and visual field–response hand condition. These seemingly contradictory conclusions may be resolved by positing several stages to the tasks, and arguing that the hemispheres are identical in processing the stages indexed by response time, accuracy and sensitivity, but that they differ in response choice, the processing stage indexed by our log beta measure. These findings may indicate processing differences between the two tasks and have implications for general models of same/different judgement tasks. Such a model is presented and discussed in detail elsewhere [14].

Our test of ZAIDEL's [24, 25] "hand by visual field" criterion revealed that it is not diagnostic in these letter-matching tasks. In addition, within an individual subject, and within six different response deadlines, consistent, interpretable patterns do not occur. The lack of a definitive pattern in the hand by visual field relations is, unfortunately, a common (though by no means universal) finding in our lab and elsewhere. The response deadlines condition shows that there is no consistency within a subject across response-time deadlines, nor is there evidence for a consistent pattern of transition from a Direct Access Pattern to a Callosal Relay pattern or vice versa.

Thus, the processing dissociation is a more effective index of direct access than the hand by visual field criterion, and when the processing dissociation fails for one dependent variable (the parameters of the SATFs) it may nonetheless succeed for another (the speed–bias functions). We conclude that both the Shape and the Name tasks are within the competencies

of both cerebral hemispheres. Rather subtle methodological differences may shift relative hemispheric superiority and this may explain the frequent conflicting data in the literature.

In summary, we have four conclusions. First, comparison of the speed–accuracy functions computed in the two visual fields across subjects revealed that they do not differ significantly from each other on any of the three parameters (intercept, slope and asymptote, $P > 0.3$). The most salient feature of these functions is their identity across visual fields. This contradicts a CR description of hemispheric contributions to this task, because no costs of callosal transfer are seen in the asymptotes or intercepts of the functions. The identity of the slopes of the functions across visual fields suggests that the hemispheres use similar speed–accuracy trade-off strategies. Thus, two separate processors may be doing the task, but we cannot distinguish between them on the basis of speed–accuracy trade-offs. Second, we have shown that in these tasks, the hand by visual field criterion does not serve to discriminate between the DA and CR models of hemispheric division of labor. Consistent, interpretable patterns do not occur across subjects or within individual subjects even when there is enough statistical power to have observed them. Third, the patterns of response biases suggest that the hemispheres may differ at least in the way they perform the response choice stage of the Name task. The fourth conclusion follows from the previous ones and has to do with a general methodological consideration: hemispheric differences need not always result in "better" performance (in terms of accuracy or latency) in one visual field over another. Accuracy and latency alone may not be sensitive to separate stages of the tasks under investigation, and may hide interesting and important hemispheric differences, observable in the speed–accuracy trade-off functions. This was the case here.

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