METHODS & DESIGNS

Tables of d' for variable-standard discrimination paradigms

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Signal detection theory (SDT) allows a bias-free measure of sensitivity, d' , to be simply estimated from discrimination data when certain conditions are met. The computation is not straightforward, however, in several popular discrimination designs, such as two- and four-interval same-different designs and the ABX design. The present tables, derived from the SDT models of Macmillan, Kaplan, and Creelman (1977), make possible the estimation of d' from these complex discrimination designs.

Signal detection theory (SDT) provides a general model for understanding an observer's sensitivity to differences between stimuli. Originally developed in the context of visual and auditory detection (Green & Swets, 1966; Tanner & Swets, 1954), the theory has been applied to a wide range of perceptual, cognitive, and other psychological tasks involving discrimination as well as detection (see Pastore & Scheirer, 1974, for examples).

In a typical experiment to which SDT can be applied, the observer is presented on each trial with a stimulus, and he must choose one of two responses, "1" and "2." Response "1" is termed a "hit" when it is correct, a "false alarm" when it is incorrect. The data from such an experiment can be reduced to a hit rate $H = \Pr(\text{"1"} | \text{response "1" was appropriate})$ and a false alarm rate $FA = \Pr(\text{"1"} | \text{response "1" was inappropriate})$. The usefulness of SDT is due in large part to the fact that, under certain assumptions, it allows a bias-free measure of sensitivity, d' , to be estimated from these two conditional probabilities. Consider a one-interval (yes-no) experiment, in which one of two signals A and B is presented on each trial. If A and B can be assumed to give rise to distributions of a decision variable that are normal and have equal variance, then d' , the distance between the means of the two distributions, is estimated

by $z(H) - z(FA)$, where $z(x)$ is the abscissa value of the unit normal integral yielding the proportion x . We will sometimes call this parameter "true d' ," to distinguish it from similar measures that do not represent such a mean difference. Tables of d' for the one-interval paradigm have been published (Elliot, 1964), but, clearly, a table of the normal distribution suffices.

It is often desirable to use SDT to analyze discrimination experiments that are more complex than the one-interval design. In many designs, each stimulus consists of a sequence of signals $\langle X_1 X_2 \dots X_n \rangle$, where some of the X_i serve as "standards" that may vary across trials, and where two or more stimuli map into each response. We will be concerned here with three such variable-standard discrimination designs: two-interval same-different (AX), the ABX design, and four-interval same-different (4IAX). Table 1 summarizes these designs. Macmillan, Kaplan, and Creelman (1977) showed that $z(H) - z(FA)$ does not estimate d' for these designs and presented models that yielded equations relating the hit and false alarm rates obtained in such experiments to d' . Unfortunately, these equations (repeated below) are difficult to use. If d' and the criterion are known, H and FA can be calculated; but if (as is the case in practice) H and FA are known, d' can be found only by iteration. Since variable-standard paradigms are extensively used, tables for estimating d' from them are needed; we present such tables here, together with brief summaries of the Macmillan et al. models from which they are derived. Evidence that these models are capable of predicting relative performance across paradigms has been presented by Creelman and Macmillan (in press).

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Table 1
Possible Stimuli Corresponding to Each Response for Three
Variable-Standard Discrimination Paradigms

Stimuli Corresponding to Response 1	Stimuli Corresponding to Response 2
AX Paradigm	
(AA)	(AB)
(BB)	(BA)
ABX Paradigm	
(ABA)	(ABB)
(BAB)	(BAA)
4IAX Paradigm	
(AA AB)	(AB AA)
(AA BA)	(BA AA)
(BB AB)	(AB BB)
(BB BA)	(BA BB)

TWO-INTERVAL SAME-DIFFERENT (AX)

In the AX design, the observer must decide whether the two signals in a stimulus presentation are the same or different; this design was first analyzed by Sorkin (1962). In a special case of Sorkin's solution, the observer bases his decision on $|X_1 - X_2|$, the absolute difference between his observations in the two intervals of a single trial, responding "same" if this difference is smaller than a criterion k , and "different" if it is larger. This decision rule leads to the following expressions for the hit and false alarm rates:

$$P(\text{"same"} | \langle AA \rangle \text{ or } \langle BB \rangle) = H = 2\Phi(k/\sqrt{2}) - 1,$$

and

$$P(\text{"same"} | \langle AB \rangle \text{ or } \langle BA \rangle) = FA = \Phi[(k - d')/\sqrt{2}] - \Phi[-(k + d')/\sqrt{2}], \quad (1)$$

where Φ is the unit normal distribution function. The statistic $z(H) - z(FA)$ is not an adequate estimate of d' in the AX design for two reasons: (1) It is correlated with the observer's bias, that is, the ROC curves described by Equation 1 do not have unit slope; and (2) even if bias is held constant, $z(H) - z(FA)$ is less than, and nonlinear with, true d' . These shortcomings are illustrated by Macmillan et al. (1977).

Table 2 gives values of true d' for every (H,FA) pair such that $H \geq FA$. It is important to note that H and FA are defined as $P(\text{"S"} | S)$ and $P(\text{"S"} | D)$; that is, $P(\text{"same"} | \text{same})$ and $P(\text{"same"} | \text{different})$. One could choose to call $P(\text{"D"} | D)$ and $P(\text{"D"} | S)$ the hit and false alarm rates, but in that case they must be subtracted from 1 before the table can be used. To illustrate, if $H = P(\text{"S"} | S) = .10$ and $FA = P(\text{"S"} | D) = .01$, the table shows that $d' = 3.04$. However, if $P(\text{"D"} | D) = .10$

and $P(\text{"D"} | S) = .01$, then $H = P(\text{"S"} | S) = .99$ and $FA = P(\text{"S"} | D) = .90$, and the table shows that $d' = 1.83$. The fact that these two hit/false alarm pairs yield different values of d' reflects the fact that ROC curves for the AX paradigm do not have unit slope.

THE ABX DESIGN

In the ABX design, the observer must decide whether the third signal of a stimulus is the same as the first or the same as the second. The decision space is two-dimensional: Both the value of X_3 and the (signed) value of $X_1 - X_2$, which provides information about whether intervals 1 and 2 were (AB) or (BA), must be considered. (For a geometric portrayal of the situation, see Figure 4 of Macmillan et al., 1977). Expressions for the hit and false alarm rates are difficult to formulate analytically for the general case of a biased observer, but, according to our simulations, ROC curves produced by the optimal decision rule for this paradigm have essentially unit slope. This means that $z(H) - z(FA)$ is not correlated with the observer's criterion; we denote this unbiased statistic by d'_s .

For an unbiased observer, that is, an observer who sets the criterion such that $H = 1 - FA$, it is possible to specify the ABX hit and false alarm rates as a function of d' :

$$\begin{aligned} H &= P(\text{"1"} | \langle ABA \rangle) = P(\text{"1"} | \langle BAB \rangle) \\ &= \Phi(d'/\sqrt{2})\Phi(d'/2) + \Phi(-d'/\sqrt{2})\Phi(-d'/2) \\ &= 1 - FA. \end{aligned} \quad (2)$$

Since ROC curves for the ABX design have unit slope, the value of d'_s will be the same for a biased observer as for an unbiased one. Thus, values of d' can be estimated from hit and false alarm rates by first computing $d'_s = z(H) - z(FA)$, then transforming d'_s into d' . The latter transformation can be derived from Equation 2 and is given in Table 3. For example, suppose $H = .10$ and $FA = .01$ are observed in an ABX paradigm. Then, $d'_s = z(H) - z(FA) = -1.282 - (-2.327) = 1.05$. Table 3 reveals that the corresponding value of true d' is 1.53.

FOUR-INTERVAL SAME-DIFFERENT (4IAX)

In the 4IAX design, each stimulus consists of two pairs of signals, and it is the observer's task to decide whether the first pair or the second pair consists of two identical signals. We discuss two different strategies that observers might use in this paradigm.

In the "differencing strategy" described by Macmillan et al. (1977), the observer bases his response on the differences between the two pairs of signals, that is, on $X_1 - X_2$ and $X_3 - X_4$. This strategy yields ROC curves

of unit slope, so true d' values can be found by first computing $d'_s = z(H) - z(FA)$, then transforming d'_s into d' . The relation between the observed hit and false alarm rates and d' is given by:

$$H = P("1" | \langle AABA \rangle \text{ or } \langle AAAB \rangle \text{ or } \langle BBAB \rangle \text{ or } \langle BBBA \rangle) \\ = [\Phi(d'/2)]^2 + [\Phi(-d'/2)]^2 = 1 - FA. \quad (3)$$

Equation 3 has been used to generate the transformation between d'_s and d' given in Table 3. If $H = .10$ and $FA = .01$ are observed in a 4IAX paradigm, then $d'_s = 1.05$ (as shown above in discussing the ABX design). According to Table 3, if the observer is using the differencing strategy, his true d' is 1.80.

In the "optimal strategy" for 4IAX, the decision space has four dimensions, corresponding to the observations X_1 , X_2 , X_3 , and X_4 . Each of the eight possible four-signal stimuli leads to a distribution in this space. The unbiased observer should calculate the distances between a given observation and the means of each of these distributions and make the response corresponding to the closest distribution.

As we have not been able to write analytic expressions for hit and false alarm rates in the 4IAX paradigm using the optimal strategy, we have used a Monte Carlo simulation to produce the last column in Table 3. In this simulation, each of 200,000 trials consisted of the generation of four samples of random normal noise, one for each of the four observation intervals. For each value of d' to be tested, the simulation determined which of the eight distributions was closest to the observed four-dimensional observation vector. If that was one of the four distributions in the class that included the actual stimulus, then the response was counted as correct. Our faith in the accuracy of this simulation is enhanced by its ability to reproduce the other columns in Table 3 to within .02 d' units. Another simulation revealed that the ROC curves generated by

the optimal strategy have approximately unit slope.¹ To complete the running example, an observer in 4IAX who is using the optimal strategy, and for whom $H = .10$ and $FA = .01$ (and thus $d'_s = 1.05$), has a true d' of 1.43.

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NOTE

1. In these calculations, and in other simulations used to estimate ROC slopes for ABX and 4IAX/differencing models, a number of computational shortcuts and tricks were used to speed computation. Details are available from Howard Kaplan, Addiction Research Foundation, Toronto, Ontario M5S 2S1, Canada.

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Table 2

True d' rates for the same-different paradigm

		False alarm rate = $p(\text{"same"} \text{different})$									
		.01	.02	.03	.04	.05	.06	.07	.08	.09	.10
Hit rate = $p(\text{"same"} \text{same})$											
.01	.00										
.02	1.67	.00									
.03	2.10	1.27	.00								
.04	2.36	1.67	1.07	.00							
.05	2.54	1.92	1.43	.95	.00						
.06	2.68	2.10	1.67	1.28	.86	.00					
.07	2.79	2.24	1.84	1.50	1.16	.79	.00				
.08	2.89	2.36	1.98	1.66	1.37	1.07	.72	.00			
.09	2.97	2.46	2.10	1.81	1.54	1.28	1.00	.69	.00		
.10	3.04	2.54	2.20	1.92	1.67	1.43	1.20	.95	.65	.00	
.11	3.11	2.62	2.29	2.02	1.78	1.56	1.35	1.13	.90	.62	
.12	3.17	2.69	2.36	2.10	1.88	1.67	1.47	1.28	1.08	.86	
.13	3.22	2.75	2.43	2.18	1.96	1.77	1.58	1.40	1.22	1.03	
.14	3.27	2.80	2.50	2.25	2.04	1.85	1.67	1.50	1.34	1.17	
.15	3.31	2.86	2.55	2.31	2.11	1.93	1.76	1.60	1.44	1.28	
.16	3.35	2.90	2.61	2.37	2.17	1.99	1.83	1.68	1.53	1.38	
.17	3.39	2.95	2.65	2.42	2.23	2.06	1.90	1.75	1.61	1.47	
.18	3.43	2.99	2.70	2.47	2.28	2.11	1.96	1.82	1.68	1.55	
.19	3.46	3.03	2.74	2.52	2.33	2.17	2.02	1.88	1.75	1.62	
.20	3.50	3.07	2.78	2.56	2.38	2.22	2.07	1.94	1.81	1.68	
.21	3.53	3.10	2.82	2.61	2.42	2.27	2.12	1.99	1.86	1.74	
.22	3.56	3.14	2.86	2.65	2.47	2.31	2.17	2.04	1.92	1.80	
.23	3.59	3.17	2.90	2.68	2.51	2.35	2.21	2.08	1.97	1.85	
.24	3.62	3.20	2.93	2.72	2.54	2.39	2.25	2.13	2.01	1.90	
.25	3.65	3.23	2.96	2.75	2.58	2.43	2.29	2.17	2.06	1.95	
.26	3.68	3.26	2.99	2.79	2.62	2.47	2.33	2.21	2.10	1.99	
.27	3.70	3.29	3.02	2.82	2.65	2.50	2.37	2.25	2.14	2.03	
.28	3.73	3.32	3.05	2.85	2.68	2.54	2.41	2.29	2.18	2.07	
.29	3.75	3.35	3.08	2.88	2.71	2.57	2.44	2.32	2.21	2.11	
.30	3.78	3.37	3.11	2.91	2.74	2.60	2.47	2.36	2.25	2.15	
.31	3.80	3.40	3.14	2.94	2.77	2.63	2.50	2.39	2.28	2.18	
.32	3.83	3.42	3.16	2.97	2.80	2.66	2.54	2.42	2.32	2.22	
.33	3.85	3.45	3.19	2.99	2.83	2.69	2.57	2.45	2.35	2.25	
.34	3.87	3.47	3.22	3.02	2.86	2.72	2.60	2.48	2.38	2.28	
.35	3.90	3.50	3.24	3.05	2.89	2.75	2.62	2.51	2.41	2.32	
.36	3.92	3.52	3.27	3.07	2.91	2.77	2.65	2.54	2.44	2.35	
.37	3.94	3.55	3.29	3.10	2.94	2.80	2.68	2.57	2.47	2.38	
.38	3.97	3.57	3.32	3.12	2.96	2.83	2.71	2.60	2.50	2.41	
.39	3.99	3.59	3.34	3.15	2.99	2.85	2.73	2.63	2.53	2.44	
.40	4.01	3.62	3.36	3.17	3.02	2.88	2.76	2.65	2.56	2.46	
.41	4.03	3.64	3.39	3.20	3.04	2.91	2.79	2.68	2.58	2.49	
.42	4.06	3.66	3.41	3.22	3.07	2.93	2.81	2.71	2.61	2.52	
.43	4.08	3.69	3.44	3.25	3.09	2.96	2.84	2.73	2.64	2.55	
.44	4.10	3.71	3.46	3.27	3.11	2.98	2.86	2.76	2.66	2.57	
.45	4.12	3.73	3.48	3.29	3.14	3.01	2.89	2.79	2.69	2.60	
.46	4.15	3.76	3.51	3.32	3.16	3.03	2.92	2.81	2.71	2.63	
.47	4.17	3.78	3.53	3.34	3.19	3.06	2.94	2.84	2.74	2.65	
.48	4.19	3.80	3.55	3.37	3.21	3.08	2.97	2.86	2.77	2.68	
.49	4.21	3.83	3.58	3.39	3.24	3.11	2.99	2.89	2.79	2.70	
.50	4.24	3.85	3.60	3.41	3.26	3.13	3.02	2.91	2.82	2.73	

	False alarm rate = $p(\text{"same"} \text{different})$									
	.01	.02	.03	.04	.05	.06	.07	.08	.09	.10
Hit rate = $p(\text{"same"} \text{same})$										
.51	4.26	3.87	3.62	3.44	3.29	3.15	3.04	2.94	2.84	2.76
.52	4.28	3.90	3.65	3.46	3.31	3.18	3.06	2.96	2.87	2.78
.53	4.31	3.92	3.67	3.49	3.33	3.20	3.09	2.99	2.89	2.81
.54	4.33	3.94	3.70	3.51	3.36	3.23	3.12	3.01	2.92	2.83
.55	4.35	3.97	3.72	3.54	3.38	3.25	3.14	3.04	2.94	2.86
.56	4.38	3.99	3.75	3.56	3.41	3.28	3.17	3.06	2.97	2.88
.57	4.40	4.02	3.77	3.58	3.43	3.30	3.19	3.09	3.00	2.91
.58	4.43	4.04	3.80	3.61	3.46	3.33	3.22	3.12	3.02	2.94
.59	4.45	4.07	3.82	3.64	3.48	3.36	3.24	3.14	3.05	2.96
.60	4.48	4.09	3.85	3.66	3.51	3.38	3.27	3.17	3.08	2.99
.61	4.50	4.12	3.87	3.69	3.54	3.41	3.30	3.19	3.10	3.02
.62	4.53	4.14	3.90	3.71	3.56	3.44	3.32	3.22	3.13	3.04
.63	4.56	4.17	3.93	3.74	3.59	3.46	3.35	3.25	3.16	3.07
.64	4.58	4.20	3.95	3.77	3.62	3.49	3.38	3.28	3.18	3.10
.65	4.61	4.23	3.98	3.80	3.65	3.52	3.40	3.30	3.21	3.13
.66	4.64	4.25	4.01	3.82	3.67	3.55	3.43	3.33	3.24	3.16
.67	4.67	4.28	4.04	3.85	3.70	3.57	3.46	3.36	3.27	3.19
.68	4.69	4.31	4.07	3.88	3.73	3.60	3.49	3.39	3.30	3.21
.69	4.72	4.34	4.09	3.91	3.76	3.63	3.52	3.42	3.33	3.24
.70	4.75	4.37	4.12	3.94	3.79	3.66	3.55	3.45	3.36	3.28
.71	4.78	4.40	4.16	3.97	3.82	3.69	3.58	3.48	3.39	3.31
.72	4.82	4.43	4.19	4.00	3.85	3.73	3.61	3.51	3.42	3.34
.73	4.85	4.46	4.22	4.04	3.89	3.76	3.65	3.55	3.45	3.37
.74	4.88	4.50	4.25	4.07	3.92	3.79	3.68	3.58	3.49	3.40
.75	4.92	4.53	4.29	4.10	3.95	3.83	3.71	3.61	3.52	3.44
.76	4.95	4.57	4.32	4.14	3.99	3.86	3.75	3.65	3.56	3.47
.77	4.99	4.60	4.36	4.17	4.02	3.90	3.78	3.68	3.59	3.51
.78	5.02	4.64	4.39	4.21	4.06	3.93	3.82	3.72	3.63	3.55
.79	5.06	4.68	4.43	4.25	4.10	3.97	3.86	3.76	3.67	3.58
.80	5.10	4.72	4.47	4.29	4.14	4.01	3.90	3.80	3.71	3.62
.81	5.14	4.76	4.51	4.33	4.18	4.05	3.94	3.84	3.75	3.67
.82	5.18	4.80	4.56	4.37	4.22	4.09	3.98	3.88	3.79	3.71
.83	5.23	4.84	4.60	4.42	4.27	4.14	4.03	3.93	3.84	3.75
.84	5.28	4.89	4.65	4.46	4.31	4.19	4.07	3.97	3.88	3.80
.85	5.32	4.94	4.70	4.51	4.36	4.23	4.12	4.02	3.93	3.85
.86	5.38	4.99	4.75	4.56	4.41	4.29	4.17	4.07	3.98	3.90
.87	5.43	5.04	4.80	4.62	4.47	4.34	4.23	4.13	4.04	3.95
.88	5.49	5.10	4.86	4.67	4.52	4.40	4.29	4.19	4.09	4.01
.89	5.55	5.16	4.92	4.74	4.59	4.46	4.35	4.25	4.16	4.07
.90	5.61	5.23	4.99	4.80	4.65	4.52	4.41	4.31	4.22	4.14
.91	5.69	5.30	5.06	4.87	4.72	4.60	4.48	4.38	4.29	4.21
.92	5.76	5.38	5.14	4.95	4.80	4.67	4.56	4.46	4.37	4.29
.93	5.85	5.47	5.22	5.04	4.89	4.76	4.65	4.55	4.46	4.38
.94	5.95	5.56	5.32	5.14	4.99	4.86	4.75	4.65	4.56	4.47
.95	6.06	5.68	5.43	5.25	5.10	4.97	4.86	4.76	4.67	4.58
.96	6.19	5.81	5.56	5.38	5.23	5.10	4.99	4.89	4.80	4.72
.97	6.36	5.97	5.73	5.54	5.40	5.27	5.16	5.06	4.96	4.88
.98	6.58	6.19	5.95	5.77	5.62	5.49	5.38	5.28	5.19	5.10
.99	6.93	6.55	6.30	6.12	5.97	5.84	5.73	5.63	5.54	5.46

		False alarm rate = $p(\text{"same"} \text{different})$									
		.11	.12	.13	.14	.15	.16	.17	.18	.19	.20
Hit rate = $p(\text{"same"} \text{same})$											
.11	.00										
.12	.59	.00									
.13	.82	.57	.00								
.14	.99	.79	.55	.00							
.15	1.12	.95	.76	.53	.00						
.16	1.23	1.08	.92	.74	.51	.00					
.17	1.33	1.19	1.04	.89	.71	.50	.00				
.18	1.42	1.28	1.15	1.01	.86	.69	.48	.00			
.19	1.49	1.37	1.24	1.12	.98	.84	.67	.47	.00		
.20	1.56	1.44	1.33	1.21	1.08	.96	.81	.66	.46	.00	
.21	1.63	1.51	1.40	1.29	1.17	1.06	.93	.79	.64	.45	
.22	1.69	1.58	1.47	1.36	1.25	1.14	1.03	.91	.78	.63	
.23	1.74	1.64	1.53	1.43	1.33	1.22	1.12	1.00	.89	.76	
.24	1.79	1.69	1.59	1.49	1.39	1.29	1.19	1.09	.98	.87	
.25	1.84	1.74	1.65	1.55	1.45	1.36	1.26	1.17	1.07	.96	
.26	1.89	1.79	1.70	1.60	1.51	1.42	1.33	1.24	1.14	1.04	
.27	1.93	1.84	1.74	1.65	1.56	1.48	1.39	1.30	1.21	1.12	
.28	1.98	1.88	1.79	1.70	1.61	1.53	1.44	1.36	1.27	1.19	
.29	2.02	1.92	1.83	1.75	1.66	1.58	1.50	1.41	1.33	1.25	
.30	2.05	1.96	1.88	1.79	1.71	1.63	1.55	1.47	1.39	1.31	
.31	2.09	2.00	1.91	1.83	1.75	1.67	1.59	1.51	1.44	1.36	
.32	2.13	2.04	1.95	1.87	1.79	1.71	1.64	1.56	1.49	1.41	
.33	2.16	2.07	1.99	1.91	1.83	1.75	1.68	1.60	1.53	1.46	
.34	2.19	2.11	2.03	1.95	1.87	1.79	1.72	1.65	1.58	1.50	
.35	2.23	2.14	2.06	1.98	1.91	1.83	1.76	1.69	1.62	1.55	
.36	2.26	2.17	2.09	2.02	1.94	1.87	1.80	1.73	1.66	1.59	
.37	2.29	2.21	2.13	2.05	1.98	1.90	1.83	1.76	1.70	1.63	
.38	2.32	2.24	2.16	2.08	2.01	1.94	1.87	1.80	1.73	1.67	
.39	2.35	2.27	2.19	2.11	2.04	1.97	1.90	1.84	1.77	1.71	
.40	2.38	2.30	2.22	2.14	2.07	2.00	1.94	1.87	1.81	1.74	
.41	2.41	2.33	2.25	2.17	2.10	2.04	1.97	1.90	1.84	1.78	
.42	2.43	2.35	2.28	2.21	2.13	2.07	2.00	1.94	1.87	1.81	
.43	2.46	2.38	2.31	2.23	2.16	2.10	2.03	1.97	1.91	1.85	
.44	2.49	2.41	2.33	2.26	2.19	2.13	2.06	2.00	1.94	1.88	
.45	2.52	2.44	2.36	2.29	2.22	2.16	2.09	2.03	1.97	1.91	
.46	2.54	2.46	2.39	2.32	2.25	2.19	2.12	2.06	2.00	1.94	
.47	2.57	2.49	2.42	2.35	2.28	2.21	2.15	2.09	2.03	1.97	
.48	2.60	2.52	2.45	2.38	2.31	2.24	2.18	2.12	2.06	2.00	
.49	2.62	2.55	2.47	2.40	2.34	2.27	2.21	2.15	2.09	2.03	
.50	2.65	2.57	2.50	2.43	2.36	2.30	2.24	2.18	2.12	2.06	
.51	2.67	2.60	2.53	2.46	2.39	2.33	2.27	2.21	2.15	2.09	
.52	2.70	2.62	2.55	2.48	2.42	2.35	2.29	2.23	2.18	2.12	
.53	2.73	2.65	2.58	2.51	2.45	2.38	2.32	2.26	2.21	2.15	
.54	2.75	2.68	2.61	2.54	2.47	2.41	2.35	2.29	2.23	2.18	
.55	2.78	2.70	2.63	2.56	2.50	2.44	2.38	2.32	2.26	2.21	
.56	2.81	2.73	2.66	2.59	2.53	2.46	2.40	2.35	2.29	2.24	
.57	2.83	2.76	2.69	2.62	2.55	2.49	2.43	2.37	2.32	2.26	
.58	2.86	2.78	2.71	2.65	2.58	2.52	2.46	2.40	2.35	2.29	
.59	2.88	2.81	2.74	2.67	2.61	2.55	2.49	2.43	2.37	2.32	
.60	2.91	2.84	2.77	2.70	2.64	2.57	2.52	2.46	2.40	2.35	

	False alarm rate = $p(\text{"same"} \text{different})$									
	.11	.12	.13	.14	.15	.16	.17	.18	.19	.20
Hit rate = $p(\text{"same"} \text{same})$										
.61	2.94	2.86	2.79	2.73	2.66	2.60	2.54	2.49	2.43	2.38
.62	2.97	2.89	2.82	2.75	2.69	2.63	2.57	2.52	2.46	2.41
.63	2.99	2.92	2.85	2.78	2.72	2.66	2.60	2.54	2.49	2.44
.64	3.02	2.95	2.88	2.81	2.75	2.69	2.63	2.57	2.52	2.47
.65	3.05	2.98	2.91	2.84	2.78	2.72	2.66	2.60	2.55	2.49
.66	3.08	3.00	2.93	2.87	2.81	2.75	2.69	2.63	2.58	2.52
.67	3.11	3.03	2.96	2.90	2.83	2.77	2.72	2.66	2.61	2.55
.68	3.14	3.06	2.99	2.93	2.86	2.80	2.75	2.69	2.64	2.58
.69	3.17	3.09	3.02	2.96	2.90	2.83	2.78	2.72	2.67	2.62
.70	3.20	3.12	3.05	2.99	2.93	2.87	2.81	2.75	2.70	2.65
.71	3.23	3.15	3.09	3.02	2.96	2.90	2.84	2.78	2.73	2.68
.72	3.26	3.19	3.12	3.05	2.99	2.93	2.87	2.82	2.76	2.71
.73	3.29	3.22	3.15	3.08	3.02	2.96	2.91	2.85	2.80	2.74
.74	3.33	3.25	3.18	3.12	3.06	3.00	2.94	2.88	2.83	2.78
.75	3.36	3.29	3.22	3.15	3.09	3.03	2.97	2.92	2.86	2.81
.76	3.40	3.32	3.25	3.19	3.13	3.07	3.01	2.95	2.90	2.85
.77	3.43	3.36	3.29	3.22	3.16	3.10	3.04	2.99	2.94	2.88
.78	3.47	3.40	3.33	3.26	3.20	3.14	3.08	3.03	2.97	2.92
.79	3.51	3.43	3.37	3.30	3.24	3.18	3.12	3.07	3.01	2.96
.80	3.55	3.47	3.40	3.34	3.28	3.22	3.16	3.11	3.05	3.00
.81	3.59	3.51	3.45	3.38	3.32	3.26	3.20	3.15	3.09	3.04
.82	3.63	3.56	3.49	3.42	3.36	3.30	3.25	3.19	3.14	3.09
.83	3.68	3.60	3.53	3.47	3.41	3.35	3.29	3.23	3.18	3.13
.84	3.72	3.65	3.58	3.51	3.45	3.39	3.34	3.28	3.23	3.18
.85	3.77	3.70	3.63	3.56	3.50	3.44	3.39	3.33	3.28	3.23
.86	3.82	3.75	3.68	3.62	3.55	3.49	3.44	3.38	3.33	3.28
.87	3.88	3.80	3.73	3.67	3.61	3.55	3.49	3.44	3.38	3.33
.88	3.93	3.86	3.79	3.73	3.66	3.61	3.55	3.49	3.44	3.39
.89	3.99	3.92	3.85	3.79	3.73	3.67	3.61	3.55	3.50	3.45
.90	4.06	3.99	3.92	3.85	3.79	3.73	3.68	3.62	3.57	3.52
.91	4.13	4.06	3.99	3.93	3.86	3.80	3.75	3.69	3.64	3.59
.92	4.21	4.14	4.07	4.00	3.94	3.88	3.83	3.77	3.72	3.67
.93	4.30	4.22	4.16	4.09	4.03	3.97	3.91	3.86	3.80	3.75
.94	4.39	4.32	4.25	4.19	4.13	4.07	4.01	3.95	3.90	3.85
.95	4.51	4.43	4.36	4.30	4.24	4.18	4.12	4.07	4.01	3.96
.96	4.64	4.57	4.50	4.43	4.37	4.31	4.25	4.20	4.15	4.09
.97	4.80	4.73	4.66	4.60	4.53	4.48	4.42	4.36	4.31	4.26
.98	5.02	4.95	4.88	4.82	4.76	4.70	4.64	4.58	4.53	4.48
.99	5.38	5.30	5.24	5.17	5.11	5.05	4.99	4.94	4.88	4.83

	False alarm rate = $p(\text{"same"} \text{different})$									
	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30
Hit rate = $p(\text{"same"} \text{same})$										
.21	.00									
.22	.44	.00								
.23	.61	.43	.00							
.24	.74	.60	.42	.00						
.25	.85	.73	.59	.41	.00					
.26	.94	.83	.71	.58	.40	.00				
.27	1.02	.92	.82	.70	.57	.40	.00			
.28	1.10	1.00	.91	.80	.69	.56	.39	.00		
.29	1.16	1.08	.99	.89	.79	.68	.55	.38	.00	
.30	1.22	1.14	1.06	.97	.88	.78	.67	.54	.38	.00

False alarm rate = $p(\text{"same"} \text{different})$										
	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30
Hit rate = $p(\text{"same"} \text{same})$										
.31	1.28	1.20	1.12	1.04	.95	.86	.76	.66	.53	.37
.32	1.34	1.26	1.18	1.10	1.02	.94	.85	.75	.65	.52
.33	1.39	1.31	1.24	1.16	1.09	1.01	.92	.84	.74	.64
.34	1.43	1.36	1.29	1.22	1.15	1.07	.99	.91	.82	.73
.35	1.48	1.41	1.34	1.27	1.20	1.13	1.05	.98	.90	.81
.36	1.52	1.46	1.39	1.32	1.25	1.18	1.11	1.04	.96	.89
.37	1.56	1.50	1.43	1.37	1.30	1.24	1.17	1.10	1.03	.95
.38	1.60	1.54	1.48	1.41	1.35	1.28	1.22	1.15	1.08	1.01
.39	1.64	1.58	1.52	1.46	1.39	1.33	1.27	1.20	1.14	1.07
.40	1.68	1.62	1.56	1.50	1.44	1.37	1.31	1.25	1.19	1.12
.41	1.72	1.66	1.60	1.54	1.48	1.42	1.36	1.30	1.24	1.17
.42	1.75	1.69	1.63	1.57	1.52	1.46	1.40	1.34	1.28	1.22
.43	1.79	1.73	1.67	1.61	1.55	1.50	1.44	1.38	1.33	1.27
.44	1.82	1.76	1.70	1.65	1.59	1.54	1.48	1.42	1.37	1.31
.45	1.85	1.80	1.74	1.68	1.63	1.57	1.52	1.46	1.41	1.35
.46	1.88	1.83	1.77	1.72	1.66	1.61	1.55	1.50	1.45	1.39
.47	1.92	1.86	1.81	1.75	1.70	1.64	1.59	1.54	1.48	1.43
.48	1.95	1.89	1.84	1.78	1.73	1.68	1.62	1.57	1.52	1.47
.49	1.98	1.92	1.87	1.82	1.76	1.71	1.66	1.61	1.56	1.51
.50	2.01	1.95	1.90	1.85	1.80	1.74	1.69	1.64	1.59	1.54
.51	2.04	1.98	1.93	1.88	1.83	1.78	1.73	1.68	1.63	1.58
.52	2.07	2.01	1.96	1.91	1.86	1.81	1.76	1.71	1.66	1.61
.53	2.10	2.04	1.99	1.94	1.89	1.84	1.79	1.74	1.69	1.65
.54	2.13	2.07	2.02	1.97	1.92	1.87	1.82	1.77	1.73	1.68
.55	2.15	2.10	2.05	2.00	1.95	1.90	1.85	1.81	1.76	1.71
.56	2.18	2.13	2.08	2.03	1.98	1.93	1.88	1.84	1.79	1.74
.57	2.21	2.16	2.11	2.06	2.01	1.96	1.92	1.87	1.82	1.78
.58	2.24	2.19	2.14	2.09	2.04	1.99	1.95	1.90	1.85	1.81
.59	2.27	2.22	2.17	2.12	2.07	2.02	1.98	1.93	1.88	1.84
.60	2.30	2.25	2.20	2.15	2.10	2.05	2.01	1.96	1.92	1.87
.61	2.33	2.28	2.23	2.18	2.13	2.08	2.04	1.99	1.95	1.90
.62	2.36	2.31	2.26	2.21	2.16	2.11	2.07	2.02	1.98	1.93
.63	2.38	2.33	2.29	2.24	2.19	2.14	2.10	2.05	2.01	1.96
.64	2.41	2.36	2.31	2.27	2.22	2.17	2.13	2.08	2.04	2.00
.65	2.44	2.39	2.34	2.30	2.25	2.20	2.16	2.11	2.07	2.03
.66	2.47	2.42	2.37	2.33	2.28	2.23	2.19	2.15	2.10	2.06
.67	2.50	2.45	2.41	2.36	2.31	2.27	2.22	2.18	2.13	2.09
.68	2.53	2.48	2.44	2.39	2.34	2.30	2.25	2.21	2.17	2.12
.69	2.56	2.52	2.47	2.42	2.37	2.33	2.28	2.24	2.20	2.16
.70	2.60	2.55	2.50	2.45	2.41	2.36	2.32	2.27	2.23	2.19
.71	2.63	2.58	2.53	2.48	2.44	2.39	2.35	2.31	2.26	2.22
.72	2.66	2.61	2.56	2.52	2.47	2.43	2.38	2.34	2.30	2.25
.73	2.69	2.65	2.60	2.55	2.50	2.46	2.42	2.37	2.33	2.29
.74	2.73	2.68	2.63	2.58	2.54	2.49	2.45	2.41	2.37	2.32
.75	2.76	2.71	2.67	2.62	2.57	2.53	2.49	2.44	2.40	2.36
.76	2.80	2.75	2.70	2.66	2.61	2.57	2.52	2.48	2.44	2.40
.77	2.83	2.79	2.74	2.69	2.65	2.60	2.56	2.52	2.47	2.43
.78	2.87	2.82	2.78	2.73	2.68	2.64	2.60	2.55	2.51	2.47
.79	2.91	2.86	2.81	2.77	2.72	2.68	2.64	2.59	2.55	2.51
.80	2.95	2.90	2.86	2.81	2.76	2.72	2.68	2.63	2.59	2.55

	False alarm rate = $p(\text{"same"} \text{different})$									
	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30
Hit rate = $p(\text{"same"} \text{same})$										
.81	2.99	2.94	2.90	2.85	2.81	2.76	2.72	2.68	2.63	2.59
.82	3.04	2.99	2.94	2.89	2.85	2.80	2.76	2.72	2.68	2.64
.83	3.08	3.03	2.98	2.94	2.89	2.85	2.81	2.76	2.72	2.68
.84	3.13	3.08	3.03	2.99	2.94	2.90	2.85	2.81	2.77	2.73
.85	3.18	3.13	3.08	3.03	2.99	2.94	2.90	2.86	2.82	2.78
.86	3.23	3.18	3.13	3.09	3.04	3.00	2.95	2.91	2.87	2.83
.87	3.28	3.23	3.19	3.14	3.09	3.05	3.01	2.97	2.92	2.88
.88	3.34	3.29	3.24	3.20	3.15	3.11	3.07	3.02	2.98	2.94
.89	3.40	3.35	3.31	3.26	3.21	3.17	3.13	3.08	3.04	3.00
.90	3.47	3.42	3.37	3.33	3.28	3.24	3.19	3.15	3.11	3.07
.91	3.54	3.49	3.44	3.40	3.35	3.31	3.26	3.22	3.18	3.14
.92	3.62	3.57	3.52	3.48	3.43	3.39	3.34	3.30	3.26	3.22
.93	3.70	3.65	3.61	3.56	3.52	3.47	3.43	3.39	3.35	3.30
.94	3.80	3.75	3.70	3.66	3.61	3.57	3.53	3.48	3.44	3.40
.95	3.91	3.86	3.82	3.77	3.73	3.68	3.64	3.60	3.55	3.51
.96	4.04	4.00	3.95	3.90	3.86	3.81	3.77	3.73	3.69	3.65
.97	4.21	4.16	4.11	4.07	4.02	3.98	3.94	3.89	3.85	3.81
.98	4.43	4.38	4.33	4.29	4.24	4.20	4.16	4.11	4.07	4.03
.99	4.78	4.73	4.69	4.64	4.60	4.55	4.51	4.47	4.43	4.38

	False alarm rate = $p(\text{"same"} \text{different})$									
	.31	.32	.33	.34	.35	.36	.37	.38	.39	.40
Hit rate = $p(\text{"same"} \text{same})$										
.31	.00									
.32	.37	.00								
.33	.52	.36	.00							
.34	.63	.51	.36	.00						
.35	.72	.62	.50	.35	.00					
.36	.80	.71	.61	.50	.35	.00				
.37	.88	.79	.70	.60	.49	.34	.00			
.38	.94	.86	.78	.70	.60	.48	.34	.00		
.39	1.00	.93	.85	.77	.69	.59	.48	.34	.00	
.40	1.06	.99	.92	.84	.77	.68	.58	.47	.33	.00
.41	1.11	1.05	.98	.91	.84	.76	.67	.58	.47	.33
.42	1.16	1.10	1.03	.97	.90	.83	.75	.67	.57	.47
.43	1.21	1.15	1.09	1.02	.96	.89	.82	.74	.66	.57
.44	1.25	1.19	1.14	1.08	1.01	.95	.88	.81	.74	.65
.45	1.30	1.24	1.18	1.12	1.06	1.00	.94	.87	.80	.73
.46	1.34	1.28	1.23	1.17	1.11	1.05	.99	.93	.87	.80
.47	1.38	1.32	1.27	1.22	1.16	1.10	1.05	.99	.92	.86
.48	1.42	1.36	1.31	1.26	1.20	1.15	1.09	1.04	.98	.92
.49	1.46	1.40	1.35	1.30	1.25	1.19	1.14	1.08	1.03	.97
.50	1.49	1.44	1.39	1.34	1.29	1.24	1.18	1.13	1.08	1.02

False alarm rate = $p(\text{"same"} \text{different})$										
	.31	.32	.33	.34	.35	.36	.37	.38	.39	.40
Hit rate = $p(\text{"same"} \text{same})$										
.51	1.53	1.48	1.43	1.38	1.33	1.28	1.23	1.18	1.12	1.07
.52	1.56	1.51	1.47	1.42	1.37	1.32	1.27	1.22	1.17	1.11
.53	1.60	1.55	1.50	1.45	1.41	1.36	1.31	1.26	1.21	1.16
.54	1.63	1.58	1.54	1.49	1.44	1.40	1.35	1.30	1.25	1.20
.55	1.66	1.62	1.57	1.53	1.48	1.43	1.39	1.34	1.29	1.24
.56	1.70	1.65	1.61	1.56	1.51	1.47	1.42	1.38	1.33	1.28
.57	1.73	1.69	1.64	1.59	1.55	1.50	1.46	1.41	1.37	1.32
.58	1.76	1.72	1.67	1.63	1.58	1.54	1.49	1.45	1.40	1.36
.59	1.79	1.75	1.71	1.66	1.62	1.57	1.53	1.49	1.44	1.40
.60	1.83	1.78	1.74	1.69	1.65	1.61	1.56	1.52	1.48	1.43
.61	1.86	1.81	1.77	1.73	1.68	1.64	1.60	1.56	1.51	1.47
.62	1.89	1.85	1.80	1.76	1.72	1.68	1.63	1.59	1.55	1.51
.63	1.92	1.88	1.84	1.79	1.75	1.71	1.67	1.62	1.58	1.54
.64	1.95	1.91	1.87	1.83	1.78	1.74	1.70	1.66	1.62	1.58
.65	1.98	1.94	1.90	1.86	1.82	1.78	1.73	1.69	1.65	1.61
.66	2.02	1.97	1.93	1.89	1.85	1.81	1.77	1.73	1.69	1.65
.67	2.05	2.01	1.96	1.92	1.88	1.84	1.80	1.76	1.72	1.68
.68	2.08	2.04	2.00	1.96	1.92	1.88	1.83	1.79	1.75	1.72
.69	2.11	2.07	2.03	1.99	1.95	1.91	1.87	1.83	1.79	1.75
.70	2.15	2.10	2.06	2.02	1.98	1.94	1.90	1.86	1.82	1.79
.71	2.18	2.14	2.10	2.06	2.02	1.98	1.94	1.90	1.86	1.82
.72	2.21	2.17	2.13	2.09	2.05	2.01	1.97	1.93	1.89	1.86
.73	2.25	2.21	2.17	2.13	2.09	2.05	2.01	1.97	1.93	1.89
.74	2.28	2.24	2.20	2.16	2.12	2.08	2.04	2.00	1.97	1.93
.75	2.32	2.28	2.24	2.20	2.16	2.12	2.08	2.04	2.00	1.97
.76	2.35	2.31	2.27	2.23	2.19	2.16	2.12	2.08	2.04	2.00
.77	2.39	2.35	2.31	2.27	2.23	2.19	2.15	2.12	2.08	2.04
.78	2.43	2.39	2.35	2.31	2.27	2.23	2.19	2.16	2.12	2.08
.79	2.47	2.43	2.39	2.35	2.31	2.27	2.23	2.20	2.16	2.12
.80	2.51	2.47	2.43	2.39	2.35	2.31	2.27	2.24	2.20	2.16
.81	2.55	2.51	2.47	2.43	2.39	2.35	2.32	2.28	2.24	2.20
.82	2.59	2.55	2.52	2.48	2.44	2.40	2.36	2.32	2.29	2.25
.83	2.64	2.60	2.56	2.52	2.48	2.44	2.41	2.37	2.33	2.29
.84	2.69	2.65	2.61	2.57	2.53	2.49	2.45	2.42	2.38	2.34
.85	2.74	2.70	2.66	2.62	2.58	2.54	2.50	2.47	2.43	2.39
.86	2.79	2.75	2.71	2.67	2.63	2.59	2.55	2.52	2.48	2.44
.87	2.84	2.80	2.76	2.72	2.69	2.65	2.61	2.57	2.53	2.50
.88	2.90	2.86	2.82	2.78	2.74	2.71	2.67	2.63	2.59	2.56
.89	2.96	2.92	2.88	2.84	2.80	2.77	2.73	2.69	2.65	2.62
.90	3.03	2.99	2.95	2.91	2.87	2.83	2.80	2.76	2.72	2.68
.91	3.10	3.06	3.02	2.98	2.94	2.90	2.87	2.83	2.79	2.76
.92	3.18	3.14	3.10	3.06	3.02	2.98	2.95	2.91	2.87	2.83
.93	3.26	3.22	3.18	3.15	3.11	3.07	3.03	2.99	2.96	2.92
.94	3.36	3.32	3.28	3.24	3.21	3.17	3.13	3.09	3.06	3.02
.95	3.47	3.43	3.39	3.36	3.32	3.28	3.24	3.20	3.17	3.13
.96	3.61	3.57	3.53	3.49	3.45	3.41	3.37	3.34	3.30	3.26
.97	3.77	3.73	3.69	3.65	3.61	3.58	3.54	3.50	3.46	3.43
.98	3.99	3.95	3.91	3.87	3.83	3.80	3.76	3.72	3.69	3.65
.99	4.34	4.30	4.27	4.23	4.19	4.15	4.11	4.08	4.04	4.00

False alarm rate = $p(\text{"same"} \text{different})$										
	.41	.42	.43	.44	.45	.46	.47	.48	.49	.50
Hit rate = $p(\text{"same"} \text{same})$										
.41	.00									
.42	.33	.00								
.43	.46	.32	.00							
.44	.56	.46	.32	.00						
.45	.65	.56	.45	.32	.00					
.46	.72	.64	.55	.45	.32	.00				
.47	.79	.72	.64	.55	.45	.31	.00			
.48	.85	.78	.71	.63	.54	.44	.31	.00		
.49	.91	.84	.78	.71	.63	.54	.44	.31	.00	
.50	.96	.90	.84	.77	.70	.62	.54	.44	.31	.00
.51	1.01	.96	.90	.83	.77	.70	.62	.53	.43	.31
.52	1.06	1.01	.95	.89	.83	.76	.69	.62	.53	.43
.53	1.11	1.05	1.00	.94	.88	.82	.76	.69	.61	.53
.54	1.15	1.10	1.05	.99	.94	.88	.82	.75	.68	.61
.55	1.19	1.14	1.09	1.04	.99	.93	.87	.81	.75	.68
.56	1.23	1.19	1.14	1.09	1.03	.98	.93	.87	.81	.75
.57	1.27	1.23	1.18	1.13	1.08	1.03	.98	.92	.86	.80
.58	1.31	1.27	1.22	1.17	1.12	1.07	1.02	.97	.92	.86
.59	1.35	1.31	1.26	1.21	1.17	1.12	1.07	1.02	.97	.91
.60	1.39	1.34	1.30	1.25	1.21	1.16	1.11	1.06	1.01	.96
.61	1.43	1.38	1.34	1.29	1.25	1.20	1.16	1.11	1.06	1.01
.62	1.46	1.42	1.38	1.33	1.29	1.24	1.20	1.15	1.10	1.06
.63	1.50	1.46	1.41	1.37	1.33	1.28	1.24	1.19	1.15	1.10
.64	1.53	1.49	1.45	1.41	1.37	1.32	1.28	1.23	1.19	1.14
.65	1.57	1.53	1.49	1.45	1.40	1.36	1.32	1.28	1.23	1.19
.66	1.60	1.56	1.52	1.48	1.44	1.40	1.36	1.31	1.27	1.23
.67	1.64	1.60	1.56	1.52	1.48	1.44	1.40	1.35	1.31	1.27
.68	1.68	1.64	1.60	1.56	1.52	1.47	1.43	1.39	1.35	1.31
.69	1.71	1.67	1.63	1.59	1.55	1.51	1.47	1.43	1.39	1.35
.70	1.75	1.71	1.67	1.63	1.59	1.55	1.51	1.47	1.43	1.39
.71	1.78	1.74	1.70	1.66	1.63	1.59	1.55	1.51	1.47	1.43
.72	1.82	1.78	1.74	1.70	1.66	1.62	1.59	1.55	1.51	1.47
.73	1.85	1.81	1.78	1.74	1.70	1.66	1.62	1.58	1.55	1.51
.74	1.89	1.85	1.81	1.78	1.74	1.70	1.66	1.62	1.58	1.55
.75	1.93	1.89	1.85	1.81	1.78	1.74	1.70	1.66	1.62	1.59
.76	1.96	1.93	1.89	1.85	1.81	1.78	1.74	1.70	1.66	1.63
.77	2.00	1.97	1.93	1.89	1.85	1.82	1.78	1.74	1.70	1.67
.78	2.04	2.01	1.97	1.93	1.89	1.86	1.82	1.78	1.75	1.71
.79	2.08	2.05	2.01	1.97	1.94	1.90	1.86	1.82	1.79	1.75
.80	2.12	2.09	2.05	2.01	1.98	1.94	1.90	1.87	1.83	1.79
.81	2.17	2.13	2.09	2.06	2.02	1.98	1.95	1.91	1.87	1.84
.82	2.21	2.17	2.14	2.10	2.06	2.03	1.99	1.96	1.92	1.88
.83	2.26	2.22	2.18	2.15	2.11	2.07	2.04	2.00	1.97	1.93
.84	2.30	2.27	2.23	2.20	2.16	2.12	2.09	2.05	2.01	1.98
.85	2.35	2.32	2.28	2.25	2.21	2.17	2.14	2.10	2.06	2.03
.86	2.41	2.37	2.33	2.30	2.26	2.23	2.19	2.15	2.12	2.08
.87	2.46	2.43	2.39	2.35	2.32	2.28	2.24	2.21	2.17	2.14
.88	2.52	2.48	2.45	2.41	2.37	2.34	2.30	2.27	2.23	2.20
.89	2.58	2.54	2.51	2.47	2.44	2.40	2.37	2.33	2.29	2.26
.90	2.65	2.61	2.57	2.54	2.50	2.47	2.43	2.40	2.36	2.32

False alarm rate = $p(\text{"same"} \text{different})$										
	.41	.42	.43	.44	.45	.46	.47	.48	.49	.50
Hit rate = $p(\text{"same"} \text{same})$										
.91	2.72	2.68	2.65	2.61	2.57	2.54	2.50	2.47	2.43	2.40
.92	2.80	2.76	2.73	2.69	2.65	2.62	2.58	2.55	2.51	2.48
.93	2.88	2.85	2.81	2.78	2.74	2.70	2.67	2.63	2.60	2.56
.94	2.98	2.95	2.91	2.87	2.84	2.80	2.77	2.73	2.70	2.66
.95	3.09	3.06	3.02	2.99	2.95	2.91	2.88	2.84	2.81	2.77
.96	3.23	3.19	3.15	3.12	3.08	3.05	3.01	2.98	2.94	2.90
.97	3.39	3.35	3.32	3.28	3.25	3.21	3.18	3.14	3.10	3.07
.98	3.61	3.58	3.54	3.50	3.47	3.43	3.40	3.36	3.33	3.29
.99	3.96	3.93	3.89	3.86	3.82	3.79	3.75	3.71	3.68	3.64

False alarm rate = $p(\text{"same"} \text{different})$										
	.51	.52	.53	.54	.55	.56	.57	.58	.59	.60
Hit rate = $p(\text{"same"} \text{same})$										
.51	.00									
.52	.30	.00								
.53	.43	.30	.00							
.54	.52	.43	.30	.00						
.55	.61	.52	.42	.30	.00					
.56	.68	.60	.52	.42	.30	.00				
.57	.74	.67	.60	.52	.42	.30	.00			
.58	.80	.74	.67	.60	.52	.42	.29	.00		
.59	.86	.80	.73	.67	.59	.51	.42	.29	.00	
.60	.91	.85	.79	.73	.67	.59	.51	.42	.29	.00
.61	.96	.91	.85	.79	.73	.66	.59	.51	.41	.29
.62	1.01	.96	.90	.85	.79	.73	.66	.59	.51	.41
.63	1.05	1.00	.95	.90	.84	.79	.73	.66	.59	.51
.64	1.10	1.05	1.00	.95	.90	.84	.79	.72	.66	.59
.65	1.14	1.09	1.05	1.00	.95	.90	.84	.78	.72	.66
.66	1.18	1.14	1.09	1.05	1.00	.95	.89	.84	.78	.72
.67	1.23	1.18	1.14	1.09	1.04	.99	.94	.89	.84	.78
.68	1.27	1.22	1.18	1.13	1.09	1.04	.99	.94	.89	.84
.69	1.31	1.27	1.22	1.18	1.13	1.09	1.04	.99	.94	.89
.70	1.35	1.31	1.26	1.22	1.18	1.13	1.09	1.04	.99	.94
.71	1.39	1.35	1.31	1.26	1.22	1.18	1.13	1.09	1.04	.99
.72	1.43	1.39	1.35	1.31	1.26	1.22	1.18	1.13	1.09	1.04
.73	1.47	1.43	1.39	1.35	1.31	1.26	1.22	1.18	1.13	1.09
.74	1.51	1.47	1.43	1.39	1.35	1.31	1.27	1.22	1.18	1.14
.75	1.55	1.51	1.47	1.43	1.39	1.35	1.31	1.27	1.23	1.18
.76	1.59	1.55	1.51	1.47	1.43	1.39	1.35	1.31	1.27	1.23
.77	1.63	1.59	1.55	1.51	1.48	1.44	1.40	1.36	1.31	1.27
.78	1.67	1.63	1.60	1.56	1.52	1.48	1.44	1.40	1.36	1.32
.79	1.71	1.68	1.64	1.60	1.56	1.52	1.49	1.45	1.41	1.37
.80	1.76	1.72	1.68	1.64	1.61	1.57	1.53	1.49	1.45	1.41

	False alarm rate = p("same" different)									
	.51	.52	.53	.54	.55	.56	.57	.58	.59	.60
Hit rate =										
p("same" same)										
.81	1.80	1.76	1.73	1.69	1.65	1.61	1.58	1.54	1.50	1.46
.82	1.85	1.81	1.77	1.74	1.70	1.66	1.62	1.59	1.55	1.51
.83	1.89	1.86	1.82	1.78	1.75	1.71	1.67	1.63	1.60	1.56
.84	1.94	1.91	1.87	1.83	1.80	1.76	1.72	1.68	1.65	1.61
.85	1.99	1.96	1.92	1.88	1.85	1.81	1.77	1.74	1.70	1.66
.86	2.05	2.01	1.97	1.94	1.90	1.86	1.83	1.79	1.75	1.72
.87	2.10	2.07	2.03	1.99	1.96	1.92	1.88	1.85	1.81	1.77
.88	2.16	2.12	2.09	2.05	2.02	1.98	1.94	1.91	1.87	1.83
.89	2.22	2.19	2.15	2.11	2.08	2.04	2.01	1.97	1.93	1.90
.90	2.29	2.25	2.22	2.18	2.15	2.11	2.07	2.04	2.00	1.96
.91	2.36	2.33	2.29	2.25	2.22	2.18	2.15	2.11	2.07	2.04
.92	2.44	2.40	2.37	2.33	2.30	2.26	2.23	2.19	2.15	2.12
.93	2.53	2.49	2.46	2.42	2.38	2.35	2.31	2.28	2.24	2.20
.94	2.62	2.59	2.55	2.52	2.48	2.45	2.41	2.37	2.34	2.30
.95	2.74	2.70	2.67	2.63	2.59	2.56	2.52	2.49	2.45	2.41
.96	2.87	2.83	2.80	2.76	2.73	2.69	2.66	2.62	2.58	2.55
.97	3.03	3.00	2.96	2.93	2.89	2.86	2.82	2.78	2.75	2.71
.98	3.25	3.22	3.18	3.15	3.11	3.08	3.04	3.00	2.97	2.93
.99	3.61	3.57	3.54	3.50	3.47	3.43	3.39	3.36	3.32	3.28

	False alarm rate = p("same" different)									
	.61	.62	.63	.64	.65	.66	.67	.68	.69	.70
Hit rate =										
p("same" same)										
.61	.00									
.62	.29	.00								
.63	.41	.29	.00							
.64	.51	.41	.29	.00						
.65	.59	.50	.41	.29	.00					
.66	.66	.58	.50	.41	.29	.00				
.67	.72	.66	.58	.50	.41	.29	.00			
.68	.78	.72	.65	.58	.50	.41	.29	.00		
.69	.84	.78	.72	.65	.58	.50	.41	.29	.00	
.70	.89	.84	.78	.72	.65	.58	.50	.41	.29	.00
.71	.94	.89	.84	.78	.72	.66	.58	.50	.41	.29
.72	.99	.94	.89	.84	.78	.72	.66	.58	.50	.41
.73	1.04	.99	.94	.89	.84	.78	.72	.66	.59	.51
.74	1.09	1.04	1.00	.95	.90	.84	.78	.72	.66	.59
.75	1.14	1.09	1.05	1.00	.95	.90	.84	.79	.73	.66
.76	1.19	1.14	1.10	1.05	1.00	.95	.90	.85	.79	.73
.77	1.23	1.19	1.14	1.10	1.05	1.00	.95	.90	.85	.79
.78	1.28	1.24	1.19	1.15	1.10	1.06	1.01	.96	.91	.85
.79	1.33	1.28	1.24	1.20	1.15	1.11	1.06	1.01	.96	.91
.80	1.37	1.33	1.29	1.25	1.20	1.16	1.11	1.07	1.02	.97

		False alarm rate = $p(\text{"same"} \text{different})$									
		.61	.62	.63	.64	.65	.66	.67	.68	.69	.70
Hit rate = $p(\text{"same"} \text{same})$											
.81	1.42	1.38	1.34	1.30	1.25	1.21	1.17	1.12	1.07	1.03	
.82	1.47	1.43	1.39	1.35	1.31	1.26	1.22	1.18	1.13	1.08	
.83	1.52	1.48	1.44	1.40	1.36	1.32	1.27	1.23	1.18	1.14	
.84	1.57	1.53	1.49	1.45	1.41	1.37	1.33	1.28	1.24	1.20	
.85	1.62	1.58	1.55	1.51	1.47	1.42	1.38	1.34	1.30	1.25	
.86	1.68	1.64	1.60	1.56	1.52	1.48	1.44	1.40	1.36	1.31	
.87	1.74	1.70	1.66	1.62	1.58	1.54	1.50	1.46	1.42	1.37	
.88	1.80	1.76	1.72	1.68	1.64	1.60	1.56	1.52	1.48	1.44	
.89	1.86	1.82	1.78	1.74	1.71	1.67	1.63	1.59	1.54	1.50	
.90	1.93	1.89	1.85	1.81	1.77	1.74	1.70	1.66	1.61	1.57	
.91	2.00	1.96	1.92	1.89	1.85	1.81	1.77	1.73	1.69	1.65	
.92	2.08	2.04	2.00	1.97	1.93	1.89	1.85	1.81	1.77	1.73	
.93	2.17	2.13	2.09	2.05	2.02	1.98	1.94	1.90	1.86	1.82	
.94	2.26	2.23	2.19	2.15	2.11	2.08	2.04	2.00	1.96	1.92	
.95	2.38	2.34	2.30	2.26	2.23	2.19	2.15	2.11	2.07	2.03	
.96	2.51	2.47	2.44	2.40	2.36	2.32	2.28	2.24	2.20	2.16	
.97	2.67	2.64	2.60	2.56	2.52	2.49	2.45	2.41	2.37	2.33	
.98	2.90	2.86	2.82	2.78	2.75	2.71	2.67	2.63	2.59	2.55	
.99	3.25	3.21	3.17	3.14	3.10	3.06	3.02	2.98	2.94	2.90	

		False alarm rate = $p(\text{"same"} \text{different})$									
		.71	.72	.73	.74	.75	.76	.77	.78	.79	.80
Hit rate = $p(\text{"same"} \text{same})$											
.71	.00										
.72	.29	.00									
.73	.41	.29	.00								
.74	.51	.41	.29	.00							
.75	.59	.51	.41	.29	.00						
.76	.66	.59	.51	.42	.29	.00					
.77	.73	.66	.59	.51	.42	.29	.00				
.78	.79	.73	.67	.60	.51	.42	.30	.00			
.79	.86	.80	.74	.67	.60	.52	.42	.30	.00		
.80	.92	.86	.80	.74	.68	.60	.52	.42	.30	.00	
.81	.98	.92	.87	.81	.75	.68	.61	.52	.43	.30	
.82	1.03	.98	.93	.87	.82	.75	.69	.61	.53	.43	
.83	1.09	1.04	.99	.94	.88	.82	.76	.69	.62	.53	
.84	1.15	1.10	1.05	1.00	.95	.89	.83	.77	.70	.62	
.85	1.21	1.16	1.11	1.06	1.01	.96	.90	.84	.78	.71	
.86	1.27	1.22	1.18	1.13	1.08	1.02	.97	.91	.85	.79	
.87	1.33	1.28	1.24	1.19	1.14	1.09	1.04	.98	.93	.86	
.88	1.39	1.35	1.30	1.26	1.21	1.16	1.11	1.06	1.00	.94	
.89	1.46	1.42	1.37	1.33	1.28	1.23	1.18	1.13	1.07	1.02	
.90	1.53	1.49	1.44	1.40	1.35	1.30	1.25	1.20	1.15	1.10	

	False alarm rate = $p(\text{"same"} \text{different})$									
	.71	.72	.73	.74	.75	.76	.77	.78	.79	.80
Hit rate =										
$p(\text{"same"} \text{same})$										
.91	1.61	1.56	1.52	1.47	1.43	1.38	1.33	1.28	1.23	1.18
.92	1.69	1.64	1.60	1.56	1.51	1.47	1.42	1.37	1.32	1.27
.93	1.78	1.73	1.69	1.65	1.60	1.56	1.51	1.46	1.41	1.36
.94	1.87	1.83	1.79	1.75	1.70	1.66	1.61	1.56	1.51	1.46
.95	1.99	1.95	1.90	1.86	1.82	1.77	1.72	1.68	1.63	1.58
.96	2.12	2.08	2.04	1.99	1.95	1.90	1.86	1.81	1.76	1.71
.97	2.29	2.24	2.20	2.16	2.11	2.07	2.02	1.98	1.93	1.88
.98	2.51	2.47	2.42	2.38	2.34	2.29	2.25	2.20	2.15	2.10
.99	2.86	2.82	2.78	2.73	2.69	2.64	2.60	2.55	2.50	2.45

	False alarm rate = $p(\text{"same"} \text{different})$									
	.81	.82	.83	.84	.85	.86	.87	.88	.89	.90
Hit rate =										
$p(\text{"same"} \text{same})$										
.81	.00									
.82	.30	.00								
.83	.44	.31	.00							
.84	.54	.44	.31	.00						
.85	.63	.55	.44	.31	.00					
.86	.72	.64	.55	.45	.32	.00				
.87	.80	.73	.65	.56	.46	.32	.00			
.88	.88	.81	.74	.66	.57	.47	.33	.00		
.89	.96	.90	.83	.75	.67	.58	.48	.34	.00	
.90	1.04	.98	.91	.85	.77	.69	.60	.49	.34	.00
.91	1.12	1.06	1.00	.94	.87	.79	.71	.61	.50	.35
.92	1.21	1.15	1.09	1.03	.96	.89	.81	.73	.63	.52
.93	1.30	1.25	1.19	1.13	1.07	1.00	.92	.84	.75	.65
.94	1.41	1.35	1.30	1.24	1.17	1.11	1.04	.96	.88	.79
.95	1.52	1.47	1.41	1.36	1.29	1.23	1.16	1.09	1.01	.92
.96	1.66	1.61	1.55	1.49	1.43	1.37	1.30	1.23	1.15	1.07
.97	1.83	1.77	1.72	1.66	1.60	1.54	1.47	1.40	1.33	1.25
.98	2.05	2.00	1.94	1.88	1.82	1.76	1.70	1.63	1.55	1.47
.99	2.40	2.35	2.29	2.24	2.18	2.12	2.05	1.98	1.91	1.83

	False alarm rate = $p(\text{"same"} \text{different})$								
	.91	.92	.93	.94	.95	.96	.97	.98	.99
Hit rate =									
$p(\text{"same"} \text{same})$									
.91	.00								
.92	.36	.00							
.93	.53	.38	.00						
.94	.68	.56	.40	.00					
.95	.83	.72	.59	.42	.00				
.96	.98	.88	.77	.63	.45	.00			
.97	1.16	1.07	.96	.84	.69	.49	.00		
.98	1.39	1.30	1.19	1.08	.94	.78	.56	.00	
.99	1.75	1.66	1.55	1.44	1.31	1.16	.97	.71	.00

Table 3
True d' values for the ABX and 4IAX paradigms

d's	ABX	4IAX diff	4IAX opt	d's	ABX	4IAX diff	4IAX opt	d's	ABX	4IAX diff	4IAX opt
.01	.13	.16	.08	.61	1.11	1.31	1.06	1.21	1.67	1.96	1.57
.02	.19	.22	.16	.62	1.12	1.33	1.06	1.22	1.68	1.98	1.57
.03	.23	.27	.20	.63	1.13	1.34	1.07	1.23	1.69	1.99	1.58
.04	.26	.32	.24	.64	1.14	1.35	1.08	1.24	1.70	2.00	1.59
.05	.30	.35	.27	.65	1.15	1.36	1.09	1.25	1.70	2.01	1.60
.06	.33	.39	.30	.66	1.16	1.37	1.10	1.26	1.71	2.01	1.60
.07	.35	.42	.33	.67	1.17	1.39	1.11	1.27	1.72	2.02	1.61
.08	.38	.45	.35	.68	1.18	1.40	1.12	1.28	1.73	2.03	1.62
.09	.40	.48	.38	.69	1.19	1.41	1.13	1.29	1.74	2.04	1.63
.10	.42	.50	.40	.70	1.20	1.42	1.14	1.30	1.75	2.05	1.64
.11	.44	.53	.42	.71	1.21	1.43	1.15	1.31	1.76	2.06	1.64
.12	.46	.55	.44	.72	1.22	1.45	1.16	1.32	1.76	2.07	1.65
.13	.48	.58	.46	.73	1.23	1.45	1.16	1.33	1.77	2.09	1.66
.14	.50	.60	.48	.74	1.24	1.47	1.17	1.34	1.78	2.09	1.67
.15	.52	.62	.50	.75	1.25	1.48	1.18	1.35	1.79	2.10	1.68
.16	.54	.64	.52	.76	1.26	1.49	1.19	1.36	1.80	2.11	1.68
.17	.56	.66	.53	.77	1.27	1.50	1.20	1.37	1.81	2.12	1.69
.18	.58	.68	.55	.78	1.28	1.51	1.21	1.38	1.82	2.13	1.70
.19	.59	.70	.56	.79	1.29	1.52	1.22	1.39	1.82	2.14	1.70
.20	.61	.72	.58	.80	1.30	1.54	1.23	1.40	1.83	2.15	1.71
.21	.62	.74	.60	.81	1.31	1.55	1.24	1.41	1.84	2.16	1.72
.22	.64	.76	.61	.82	1.32	1.56	1.25	1.42	1.85	2.17	1.73
.23	.65	.78	.63	.83	1.33	1.57	1.26	1.43	1.86	2.18	1.74
.24	.67	.79	.64	.84	1.34	1.58	1.26	1.44	1.87	2.19	1.74
.25	.68	.81	.66	.85	1.35	1.59	1.27	1.45	1.87	2.20	1.75
.26	.70	.83	.67	.86	1.36	1.60	1.28	1.46	1.89	2.21	1.76
.27	.71	.85	.68	.87	1.37	1.61	1.29	1.47	1.89	2.22	1.77
.28	.73	.86	.70	.88	1.37	1.62	1.30	1.48	1.90	2.23	1.77
.29	.74	.88	.71	.89	1.38	1.63	1.31	1.49	1.91	2.24	1.78
.30	.75	.89	.72	.90	1.39	1.64	1.32	1.50	1.92	2.25	1.79
.31	.77	.91	.74	.91	1.40	1.66	1.33	1.51	1.93	2.26	1.79
.32	.78	.93	.75	.92	1.41	1.66	1.33	1.52	1.94	2.27	1.80
.33	.79	.94	.76	.93	1.42	1.68	1.34	1.53	1.94	2.28	1.81
.34	.80	.96	.77	.94	1.43	1.69	1.35	1.54	1.95	2.29	1.81
.35	.82	.97	.78	.95	1.44	1.70	1.36	1.55	1.96	2.30	1.82
.36	.83	.98	.80	.96	1.45	1.71	1.37	1.56	1.97	2.31	1.83
.37	.84	1.00	.81	.97	1.46	1.72	1.38	1.57	1.98	2.31	1.84
.38	.85	1.01	.82	.98	1.47	1.73	1.38	1.58	1.98	2.33	1.84
.39	.87	1.03	.83	.99	1.47	1.74	1.39	1.59	1.99	2.33	1.85
.40	.88	1.04	.84	1.00	1.49	1.75	1.40	1.60	2.00	2.35	1.86
.41	.89	1.06	.86	1.01	1.49	1.76	1.41	1.61	2.01	2.35	1.87
.42	.90	1.07	.87	1.02	1.50	1.77	1.42	1.62	2.02	2.36	1.87
.43	.91	1.09	.88	1.03	1.51	1.78	1.42	1.63	2.03	2.37	1.88
.44	.93	1.10	.89	1.04	1.52	1.79	1.43	1.64	2.04	2.38	1.89
.45	.94	1.11	.90	1.05	1.53	1.80	1.44	1.65	2.04	2.39	1.89
.46	.95	1.13	.91	1.06	1.54	1.81	1.45	1.66	2.05	2.40	1.90
.47	.96	1.14	.92	1.07	1.55	1.82	1.46	1.67	2.06	2.41	1.91
.48	.97	1.15	.93	1.08	1.55	1.83	1.47	1.68	2.07	2.42	1.92
.49	.98	1.17	.94	1.09	1.57	1.85	1.47	1.69	2.08	2.43	1.92
.50	.99	1.18	.95	1.10	1.57	1.85	1.48	1.70	2.09	2.44	1.93
.51	1.00	1.19	.96	1.11	1.58	1.87	1.49	1.71	2.09	2.45	1.94
.52	1.01	1.20	.97	1.12	1.59	1.88	1.50	1.72	2.10	2.46	1.94
.53	1.03	1.22	.98	1.13	1.60	1.89	1.51	1.73	2.11	2.47	1.95
.54	1.04	1.23	.99	1.14	1.61	1.90	1.51	1.74	2.12	2.48	1.96
.55	1.05	1.24	1.00	1.15	1.62	1.90	1.52	1.75	2.13	2.49	1.97
.56	1.06	1.26	1.01	1.16	1.63	1.91	1.53	1.76	2.14	2.50	1.97
.57	1.07	1.26	1.02	1.17	1.63	1.92	1.54	1.77	2.14	2.50	1.98
.58	1.08	1.28	1.03	1.18	1.64	1.93	1.54	1.78	2.15	2.52	1.99
.59	1.09	1.29	1.04	1.19	1.65	1.94	1.55	1.79	2.16	2.52	2.00
.60	1.10	1.31	1.05	1.20	1.66	1.96	1.56	1.80	2.17	2.53	2.00

d's	ABX	4IAX diff	4IAX opt	d's	ABX	4IAX diff	4IAX opt	d's	ABX	4IAX diff	4IAX opt
1.81	2.18	2.54	2.01	2.41	2.68	3.09	2.43	3.01	3.19	3.64	2.83
1.82	2.19	2.55	2.02	2.42	2.68	3.11	2.43	3.02	3.19	3.65	2.84
1.83	2.19	2.56	2.02	2.43	2.69	3.11	2.44	3.03	3.21	3.66	2.84
1.84	2.20	2.57	2.03	2.44	2.70	3.13	2.45	3.04	3.21	3.67	2.85
1.85	2.21	2.58	2.04	2.45	2.71	3.13	2.45	3.05	3.22	3.68	2.85
1.86	2.22	2.59	2.05	2.46	2.72	3.14	2.46	3.06	3.23	3.69	2.86
1.87	2.23	2.60	2.05	2.47	2.73	3.15	2.47	3.07	3.24	3.70	2.87
1.88	2.24	2.61	2.06	2.48	2.74	3.16	2.47	3.08	3.25	3.70	2.88
1.89	2.24	2.62	2.07	2.49	2.75	3.17	2.48	3.09	3.26	3.71	2.88
1.90	2.25	2.63	2.07	2.50	2.75	3.18	2.49	3.10	3.26	3.72	2.89
1.91	2.26	2.63	2.08	2.51	2.76	3.19	2.50	3.11	3.27	3.73	2.90
1.92	2.27	2.65	2.09	2.52	2.77	3.20	2.50	3.12	3.28	3.74	2.90
1.93	2.28	2.66	2.10	2.53	2.78	3.20	2.51	3.13	3.29	3.75	2.91
1.94	2.29	2.66	2.10	2.54	2.79	3.21	2.52	3.14	3.30	3.76	2.92
1.95	2.29	2.67	2.11	2.55	2.79	3.22	2.52	3.15	3.31	3.77	2.92
1.96	2.30	2.68	2.12	2.56	2.80	3.23	2.53	3.16	3.32	3.78	2.93
1.97	2.31	2.69	2.12	2.57	2.81	3.24	2.54	3.17	3.33	3.79	2.94
1.98	2.32	2.70	2.13	2.58	2.82	3.25	2.54	3.18	3.33	3.80	2.94
1.99	2.33	2.71	2.14	2.59	2.83	3.26	2.55	3.19	3.34	3.80	2.95
2.00	2.34	2.72	2.15	2.60	2.84	3.27	2.56	3.20	3.35	3.82	2.96
2.01	2.34	2.73	2.15	2.61	2.84	3.28	2.56	3.21	3.36	3.82	2.96
2.02	2.35	2.74	2.16	2.62	2.85	3.29	2.57	3.22	3.37	3.83	2.97
2.03	2.36	2.75	2.17	2.63	2.86	3.30	2.58	3.23	3.38	3.84	2.98
2.04	2.37	2.76	2.17	2.64	2.87	3.30	2.58	3.24	3.39	3.85	2.98
2.05	2.38	2.77	2.18	2.65	2.88	3.31	2.59	3.25	3.40	3.86	2.99
2.06	2.39	2.77	2.19	2.66	2.89	3.32	2.60	3.26	3.40	3.87	3.00
2.07	2.39	2.78	2.19	2.67	2.90	3.33	2.60	3.27	3.41	3.88	3.00
2.08	2.40	2.79	2.20	2.68	2.90	3.34	2.61	3.28	3.42	3.89	3.01
2.09	2.41	2.80	2.21	2.69	2.91	3.35	2.62	3.29	3.43	3.90	3.02
2.10	2.42	2.81	2.21	2.70	2.92	3.36	2.63	3.30	3.44	3.91	3.02
2.11	2.43	2.82	2.22	2.71	2.93	3.37	2.63	3.31	3.45	3.92	3.03
2.12	2.44	2.83	2.23	2.72	2.94	3.38	2.64	3.32	3.46	3.92	3.04
2.13	2.44	2.84	2.24	2.73	2.95	3.39	2.65	3.33	3.47	3.93	3.04
2.14	2.45	2.85	2.24	2.74	2.95	3.40	2.65	3.34	3.48	3.94	3.05
2.15	2.46	2.86	2.25	2.75	2.97	3.41	2.66	3.35	3.48	3.95	3.06
2.16	2.47	2.87	2.26	2.76	2.97	3.42	2.66	3.36	3.49	3.96	3.06
2.17	2.48	2.88	2.26	2.77	2.98	3.42	2.67	3.37	3.50	3.97	3.07
2.18	2.49	2.89	2.27	2.78	2.99	3.43	2.68	3.38	3.51	3.98	3.07
2.19	2.49	2.89	2.28	2.79	3.00	3.44	2.68	3.39	3.52	3.99	3.08
2.20	2.50	2.90	2.28	2.80	3.01	3.45	2.69	3.40	3.53	4.00	3.09
2.21	2.51	2.91	2.29	2.81	3.01	3.46	2.70	3.41	3.54	4.01	3.09
2.22	2.52	2.92	2.30	2.82	3.02	3.47	2.70	3.42	3.55	4.02	3.10
2.23	2.53	2.93	2.31	2.83	3.03	3.48	2.71	3.43	3.55	4.02	3.11
2.24	2.54	2.94	2.31	2.84	3.04	3.49	2.72	3.44	3.56	4.03	3.12
2.25	2.54	2.95	2.32	2.85	3.05	3.50	2.72	3.45	3.57	4.04	3.12
2.26	2.55	2.96	2.33	2.86	3.06	3.51	2.73	3.46	3.58	4.05	3.13
2.27	2.56	2.97	2.33	2.87	3.07	3.52	2.74	3.47	3.59	4.06	3.13
2.28	2.57	2.98	2.34	2.88	3.08	3.52	2.74	3.48	3.60	4.07	3.14
2.29	2.58	2.99	2.35	2.89	3.08	3.53	2.75	3.49	3.61	4.08	3.15
2.30	2.59	3.00	2.35	2.90	3.09	3.54	2.76	3.50	3.62	4.09	3.15
2.31	2.59	3.00	2.36	2.91	3.10	3.55	2.76	3.51	3.63	4.10	3.16
2.32	2.60	3.01	2.37	2.92	3.11	3.56	2.77	3.52	3.63	4.11	3.17
2.33	2.61	3.02	2.37	2.93	3.12	3.57	2.78	3.53	3.64	4.12	3.17
2.34	2.62	3.03	2.38	2.94	3.13	3.58	2.78	3.54	3.65	4.13	3.18
2.35	2.63	3.04	2.39	2.95	3.14	3.59	2.79	3.55	3.66	4.13	3.19
2.36	2.64	3.05	2.39	2.96	3.14	3.60	2.80	3.56	3.67	4.14	3.20
2.37	2.64	3.06	2.40	2.97	3.15	3.60	2.80	3.57	3.68	4.15	3.20
2.38	2.65	3.07	2.41	2.98	3.16	3.61	2.81	3.58	3.69	4.16	3.21
2.39	2.66	3.08	2.42	2.99	3.17	3.62	2.82	3.59	3.70	4.17	3.22
2.40	2.67	3.09	2.42	3.00	3.18	3.63	2.82	3.60	3.71	4.18	3.22

$d's$	ABX	4IAX diff	4IAX opt	$d's$	ABX	4IAX diff	4IAX opt	$d's$	ABX	4IAX diff	4IAX opt
3.61	3.72	4.19	3.23	4.11	4.18	4.65	3.56	4.61	4.65	5.11	3.89
3.62	3.72	4.20	3.23	4.12	4.19	4.66	3.57	4.62	4.65	5.12	3.89
3.63	3.73	4.21	3.24	4.13	4.19	4.67	3.57	4.63	4.67	5.13	3.90
3.64	3.74	4.22	3.25	4.14	4.20	4.68	3.58	4.64	4.67	5.14	3.91
3.65	3.75	4.22	3.25	4.15	4.21	4.68	3.59	4.65	4.68	5.14	3.91
3.66	3.76	4.23	3.26	4.16	4.22	4.69	3.59	4.66	4.69	5.16	3.92
3.67	3.77	4.24	3.27	4.17	4.23	4.70	3.60	4.67	4.70	5.17	3.93
3.68	3.78	4.25	3.27	4.18	4.24	4.71	3.61	4.68	4.71	5.17	3.93
3.69	3.79	4.26	3.28	4.19	4.25	4.72	3.61	4.69	4.72	5.18	3.94
3.70	3.80	4.27	3.29	4.20	4.26	4.73	3.62	4.70	4.73	5.19	3.94
3.71	3.81	4.28	3.29	4.21	4.27	4.74	3.63	4.71	4.74	5.20	3.95
3.72	3.82	4.29	3.30	4.22	4.28	4.75	3.63	4.72	4.75	5.21	3.96
3.73	3.83	4.30	3.31	4.23	4.28	4.76	3.64	4.73	4.76	5.22	3.96
3.74	3.84	4.31	3.32	4.24	4.30	4.77	3.65	4.74	4.77	5.23	3.97
3.75	3.84	4.32	3.32	4.25	4.31	4.77	3.65	4.75	4.78	5.24	3.98
3.76	3.85	4.33	3.33	4.26	4.31	4.78	3.66	4.76	4.79	5.25	3.99
3.77	3.86	4.34	3.33	4.27	4.32	4.79	3.67	4.77	4.80	5.26	3.99
3.78	3.87	4.35	3.34	4.28	4.33	4.80	3.67	4.78	4.81	5.27	4.00
3.79	3.88	4.35	3.35	4.29	4.34	4.81	3.68	4.79	4.82	5.28	4.01
3.80	3.89	4.36	3.35	4.30	4.35	4.82	3.68	4.80	4.83	5.28	4.01
3.81	3.90	4.37	3.36	4.31	4.36	4.83	3.69	4.81	4.84	5.29	4.02
3.82	3.91	4.38	3.37	4.32	4.37	4.84	3.70	4.82	4.85	5.30	4.03
3.83	3.92	4.39	3.37	4.33	4.38	4.85	3.70	4.83	4.86	5.31	4.04
3.84	3.93	4.40	3.38	4.34	4.39	4.86	3.71	4.84	4.86	5.32	4.04
3.85	3.93	4.41	3.39	4.35	4.40	4.87	3.71	4.85	4.88	5.33	4.05
3.86	3.94	4.42	3.40	4.36	4.41	4.88	3.72	4.86	4.89	5.34	4.05
3.87	3.95	4.43	3.40	4.37	4.42	4.89	3.73	4.87	4.89	5.35	4.06
3.88	3.96	4.44	3.41	4.38	4.43	4.90	3.73	4.88	4.91	5.36	4.07
3.89	3.97	4.44	3.42	4.39	4.44	4.91	3.74	4.89	4.91	5.37	4.07
3.90	3.98	4.45	3.42	4.40	4.44	4.91	3.75	4.90	4.92	5.38	4.08
3.91	3.99	4.46	3.43	4.41	4.46	4.92	3.75	4.91	4.94	5.39	4.09
3.92	4.00	4.47	3.44	4.42	4.47	4.93	3.76	4.92	4.94	5.39	4.10
3.93	4.01	4.48	3.45	4.43	4.47	4.94	3.76	4.93	4.95	5.41	4.10
3.94	4.02	4.49	3.45	4.44	4.49	4.95	3.77	4.94	4.96	5.41	4.11
3.95	4.03	4.50	3.46	4.45	4.49	4.96	3.78	4.95	4.97	5.43	4.11
3.96	4.04	4.51	3.47	4.46	4.50	4.97	3.78	4.96	4.98	5.43	4.12
3.97	4.05	4.52	3.47	4.47	4.51	4.98	3.79	4.97	4.99	5.44	4.13
3.98	4.05	4.53	3.48	4.48	4.52	4.99	3.80	4.98	5.00	5.45	4.13
3.99	4.06	4.53	3.49	4.49	4.53	5.00	3.81	4.99	5.01	5.46	4.14
4.00	4.07	4.55	3.49	4.50	4.54	5.01	3.81	5.00	5.02	5.47	4.15
4.01	4.08	4.55	3.50	4.51	4.55	5.02	3.82				
4.02	4.09	4.56	3.51	4.52	4.56	5.03	3.83				
4.03	4.10	4.57	3.51	4.53	4.57	5.03	3.83				
4.04	4.11	4.58	3.52	4.54	4.58	5.04	3.84				
4.05	4.12	4.59	3.53	4.55	4.59	5.05	3.85				
4.06	4.13	4.60	3.53	4.56	4.60	5.06	3.85				
4.07	4.14	4.61	3.54	4.57	4.61	5.07	3.86				
4.08	4.15	4.62	3.55	4.58	4.62	5.08	3.87				
4.09	4.16	4.63	3.55	4.59	4.62	5.09	3.87				
4.10	4.16	4.64	3.56	4.60	4.64	5.10	3.88				
4.10	4.16	4.64	3.56	4.60	4.64	5.10	3.88				