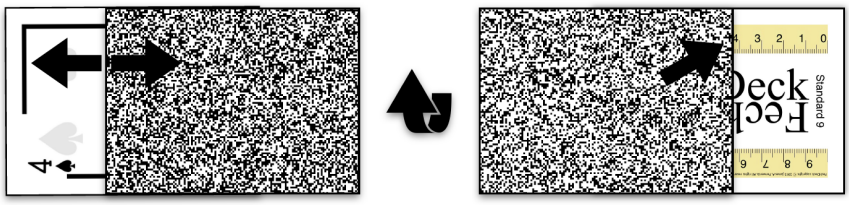
FechDeck Instructions
Version 2.0 12/27/17 jaf

Threshold methods

Method of adjustment

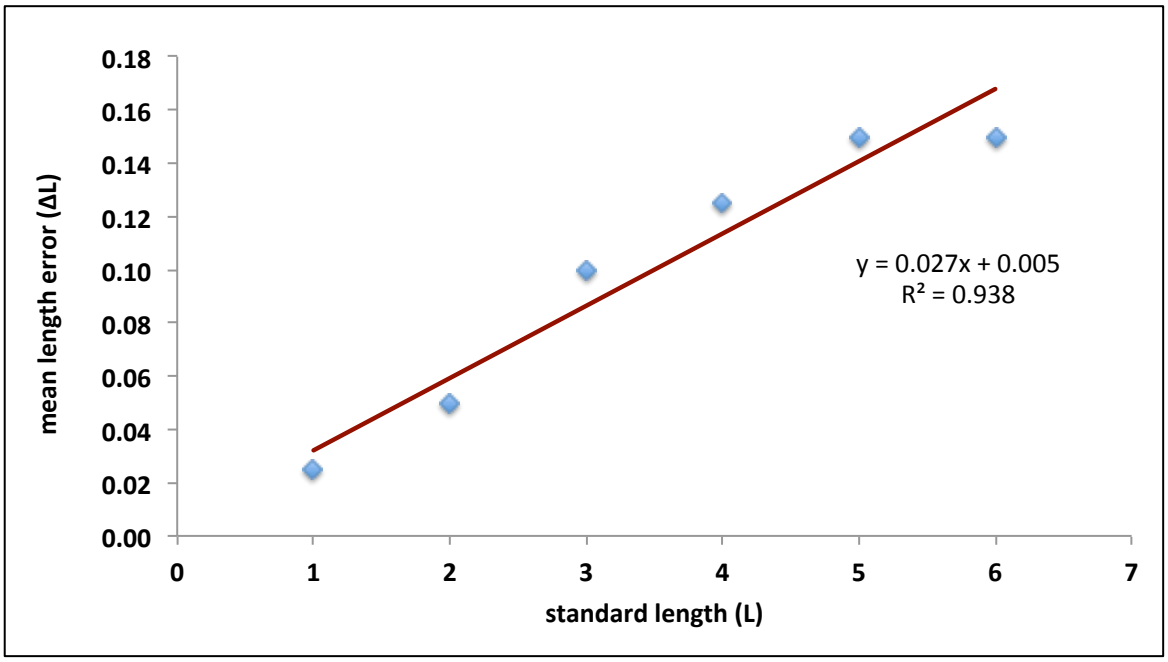


1. Extract all cards numbered 2-6 from the deck
2. Shuffle these cards together and place the shuffled pile face down on the table.
3. Pick up the top card and turn it face up, place one of the jokers on top of this card face down.
4. Holding the cards horizontally, slide the joker back and forth until the legs of the L-shaped figure in the upper left corner appear to be the same length.
5. Hold the cards in place and turn them over.
6. Note the length of the horizontal “match” leg from the top ruler on the face of the joker and the length of the vertical “standard” leg from the number on the face of the other card.
7. Enter the length of the “match” leg into the appropriate cell in the “MOA” spreadsheet.
8. Repeat steps 3-7 for the remaining cards in the pile.
9. Analyze the data using the spreadsheet.

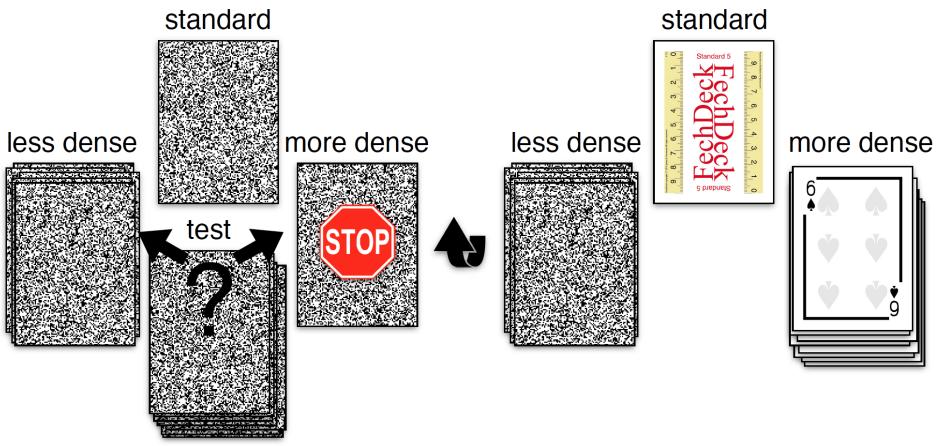
FechDeck method of adjustment worksheet
v2.0 12/27/17 jaf

Instructions: Enter the matched length for each standard length into the yellow boxes.

standard length (L)	match length				mean matched length (PSE)	mean length error (ΔL)	relative length error (k)
	spades	hearts	clubs	diamonds			
1	0.9	1.1	0.9	1	0.975	0.025	0.025
2	2.2	2	1.8	1.8	1.950	0.050	0.025
3	2.8	3.1	2.9	2.8	2.900	0.100	0.033
4	3.7	4.2	3.8	3.8	3.875	0.125	0.031
5	4.8	5	4.8	4.8	4.850	0.150	0.030
6	5.8	5.8	5.9	5.9	5.850	0.150	0.025



Method of limits



1. Place the red joker (standard 5) face down on the table as the “standard”.
2. Sort the deck face up into suits. Set aside the diamonds.
3. Sort the remaining suits into A-K order with kings on top.
4. Select the spades pile and turn it face down (ace now on top).
5. Starting from the top of the pile, compare the pattern on each card to the standard.
6. If the pattern is less dense than the standard place the card to the left, if it is more dense place the card to the right.
7. Continue this process until the first card is placed on the opposite side of the standard, then deal (do not place), the remaining cards on top of this card.
8. Turn this pile face up and record the number of the top card in the spades (ascending) box in the “MOL” spreadsheet.
9. Turn the other pile face up, and place it on top of the first pile. Pick up the merged pile and turn it face down.
10. Repeat steps 5-9 and record the number in the spades (descending) box in the MOL spreadsheet.
11. Repeat steps 4-10 for the hearts and clubs piles.
12. Repeat steps 4-11 a second time to gather sufficient data.
13. Analyze the data using the spreadsheet.
14. If desired, repeat the procedure using the black joker (standard 9).

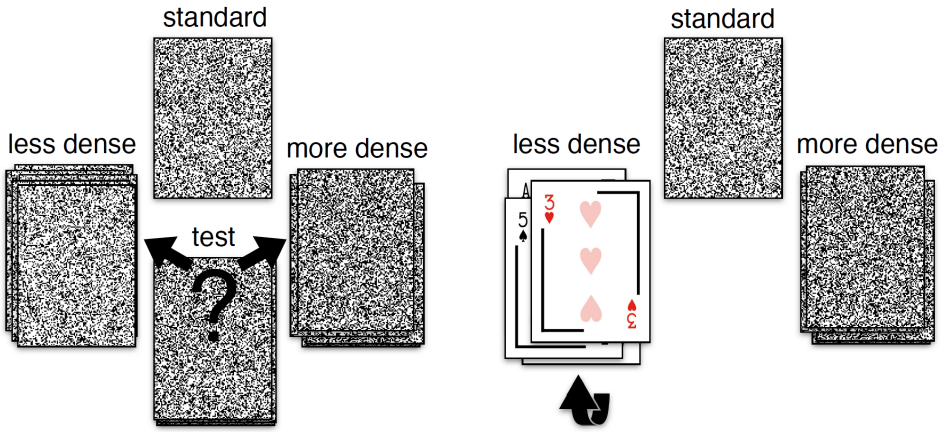
FechDeck method of limits worksheet
v2.0, 12/29/17 jaf

Instructions: For each trial series, enter the number of the first card placed in the "opposite" pile into the yellow box.

A = ascending D= descending	trial series																
	spades		hearts		clubs		spades		hearts		clubs						
	A	D	A	D	A	D	A	D	A	D	A	D					
number on first "opposite" card	6	7	6	5	6	5	4	5	6	5	6	5	**series means**	**series standard deviations**	**t-test for diff. of means, p =**	**overall mean**	**overall standard deviation**
crossover points (ascending)	5.5		5.5		5.5		3.5		5.5		5.5		5.2	0.8	0.19	5.5	0.9
crossover points (descending)		7.5		5.5		5.5		5.5		5.5		5.5	5.8	0.8			

point of subjective equality (PSE) = overall mean =	5.5
just-noticeable-difference (JND) = 0.67 * overall std. dev. =	0.57
upper threshold (UL) = PSE + JND =	6.07
lower threshold (LL) = PSE - JND =	4.93
interval of uncertainty (IU) = UL - LL =	1.14

Method of constant stimuli

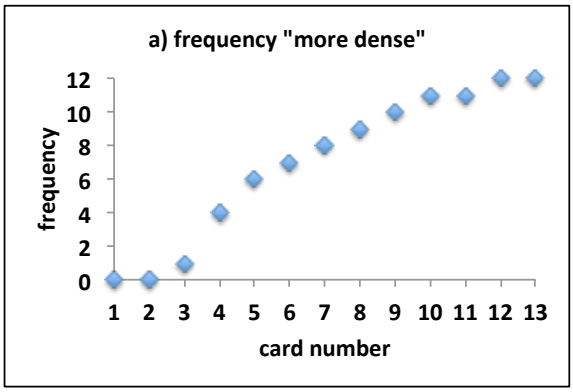


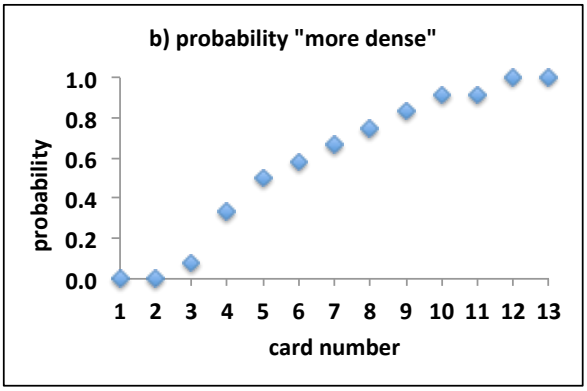
1. Place the red joker (standard 5) face down on the table as the “standard”.
2. Remove the diamonds suit from the deck. Shuffle the remaining cards to form the “test” pile.
3. Place the test pile face down below the standard.
4. Starting from the top of the test pile, compare each card to the standard. If the pattern on the card is less dense than the standard place it on the left, if it is more dense, place it on the right. Repeat for all the cards in the pile.
5. Take the “less dense” pile, turn it face up, and sort the cards by rank.
6. Enter the number of cards of each rank into the “repetition 1” column of the “MCS” spreadsheet.
7. Reassemble and shuffle the cards from the less/more dense piles.
8. Repeat steps 3-7 until the four repetitions have been completed.
9. Analyze the data using the spreadsheet.
10. If desired, repeat the procedure using the black joker (standard 9).

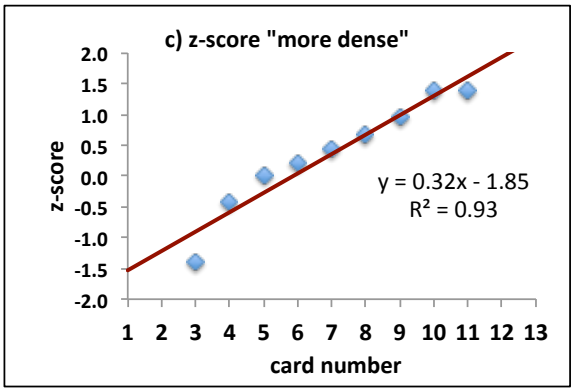
FechDeck method of constant stimuli worksheet
v2.0, 12/27/17 jaf

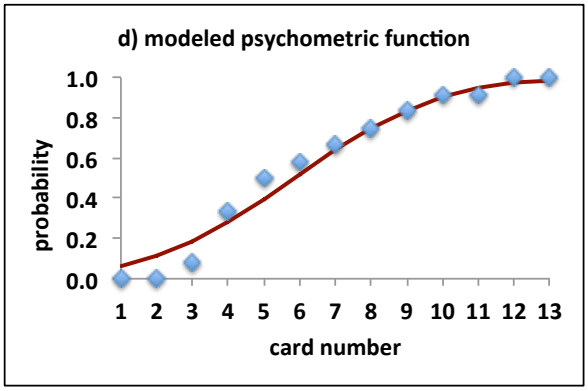
Instructions: For each repetition of the experiment, enter the number of times each card appeared in the "less dense" pile into the yellow boxes.

card number	repetition				frequency less dense	a) frequency more dense	b) probability more dense	c) z-score more dense
	1	2	3	4				
1	3	3	3	3	12	0	0.00	#N/A
2	3	3	3	3	12	0	0.00	#N/A
3	3	3	2	3	11	1	0.08	-1.38
4	2	3	1	2	8	4	0.33	-0.43
5	2	1	1	2	6	6	0.50	0.00
6	1	1	1	2	5	7	0.58	0.21
7	2	1		1	4	8	0.67	0.43
8	1	1		1	3	9	0.75	0.67
9		1		1	2	10	0.83	0.97
10			1		1	11	0.92	1.38
11		1			1	11	0.92	1.38
12					0	12	1.00	#N/A
13					0	12	1.00	#N/A





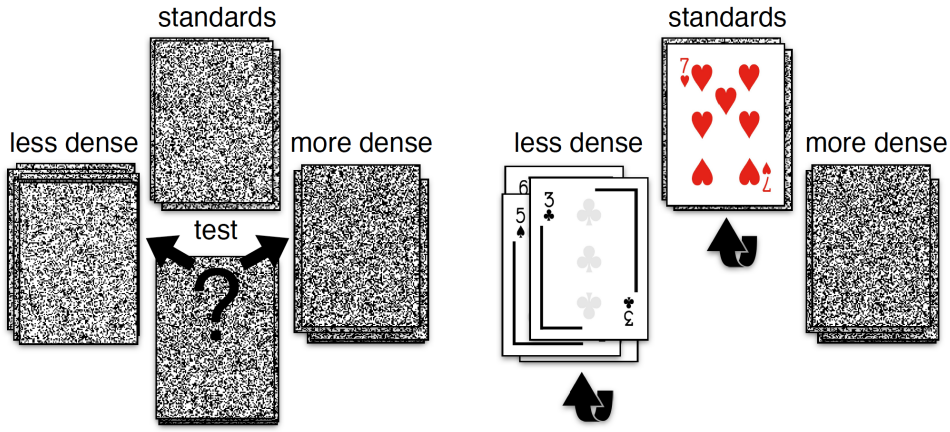




point of subjective equality (PSE) = p(0.50) = 5.86
upper threshold (UL) = p(0.75) = 8.00
lower threshold (LL) = p(0.25) = 3.72
interval of uncertainty (IU) = UL - LL = p(0.75) - p(0.25) = 4.28
upper just-noticeable-difference (JNDu) = UL - PSE = p(0.75) - p(0.50) = 2.14
lower just-noticeable-difference (JNDi) = PSE -LL = p(0.50) - p(0.25) = 2.14
average JND = (JNDu + JNDi)/2 = 2.14

Scaling methods

Pair comparison



1. Sort the deck into suits. Set aside the diamonds.
2. Extract the cards A-9 from the spades, clubs and hearts suits.
3. Shuffle together the spades and clubs to create the “test” pile. Separately shuffle the hearts to create the “standards” pile. Place the two card piles face down on the table.
4. Compare the patterns on each card in the test pile to the top card in the standards pile, sorting the test cards into “less dense” and “more dense” sub-piles.
5. Turn over the top card in the standards pile.
6. Turn over more dense sub-pile. Sort the cards by rank.
7. Enter the number of cards of each rank into the row of the “pair_comparison” spreadsheet that corresponds to the top card in the standards pile
8. Place the top standards card face up on the bottom of the standards pile. Reassemble, flip, and shuffle the test pile.
9. Repeat steps 4-8 for each card in the standards pile.
10. Repeat steps 3-9 five times, to gather sufficient data.
11. Analyze the data using the spreadsheet.

FechDeck pair comparison worksheet
v2.0 12/23/17 jaf

Instructions: For each standard card, enter the number of times each test card appears in the "more dense" pile, into the yellow boxes. Accumulate values across repetitions of the experiment.

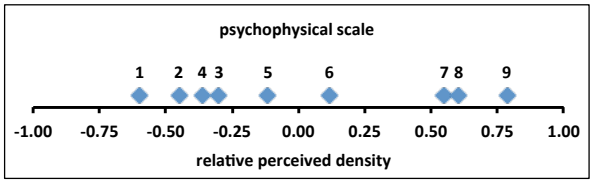
a) raw data		test card								
		1	2	3	4	5	6	7	8	9
standard card	1	5	5	6	7	8	9	9	10	10
	2		5	6	6	7	8	9	10	10
	3			5	5	6	7	8	9	10
	4				6	7	8	9	9	10
	5					5	7	7	8	9
	6						5	8	8	9
	7							5	6	8
	8								6	7
	9									5

b) F matrix		test card								
		1	2	3	4	5	6	7	8	9
standard card	1	5	5	6	7	8	9	9	10	10
	2	5	5	6	6	7	8	9	10	10
	3	4	4	5	5	6	7	8	9	10
	4	3	4	5	6	7	8	9	9	10
	5	2	3	4	3	5	7	7	8	9
	6	1	2	3	2	3	5	8	8	9
	7	1	1	2	1	3	2	5	6	8
	8	0	0	1	1	2	2	4	6	7
	9	0	0	0	0	1	1	2	3	5

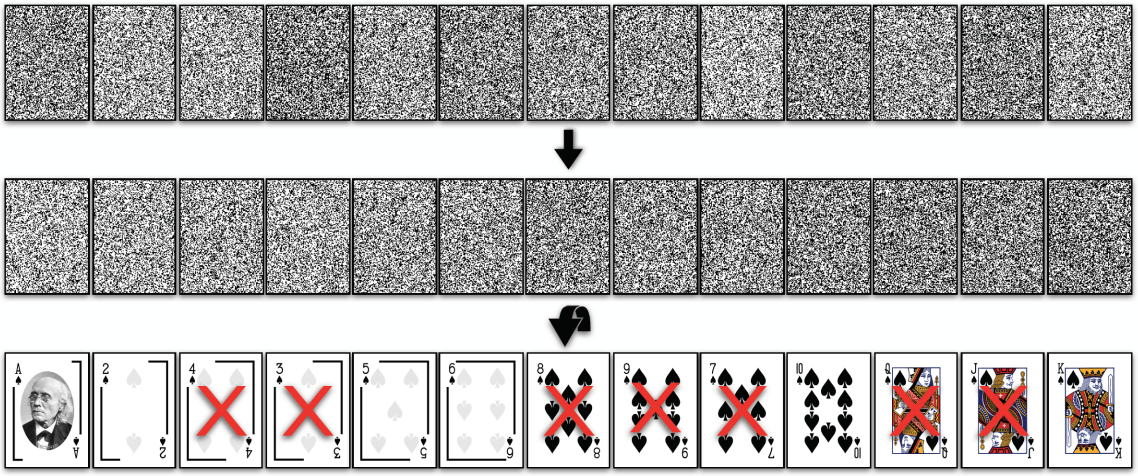
c) P matrix		test card								
		1	2	3	4	5	6	7	8	9
standard card	1	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1	1
	2	0.5	0.5	0.6	0.6	0.7	0.8	0.9	1	1
	3	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1
	4	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.9	1
	5	0.2	0.3	0.4	0.3	0.5	0.7	0.7	0.8	0.9
	6	0.1	0.2	0.3	0.2	0.3	0.5	0.8	0.8	0.9
	7	0.1	0.1	0.2	0.1	0.3	0.2	0.5	0.6	0.8
	8	0	0	0.1	0.1	0.2	0.2	0.4	0.6	0.7
	9	0	0	0	0	0.1	0.1	0.2	0.3	0.5

d) Z matrix		test card								
		1	2	3	4	5	6	7	8	9
standard card	1	0.00	0.00	0.25	0.52	0.84	1.28	1.28		
	2	0.00	0.00	0.25	0.25	0.52	0.84	1.28		
	3	-0.25	-0.25	0.00	0.00	0.25	0.52	0.84	1.28	
	4	-0.52	-0.25	0.00	0.25	0.52	0.84	1.28	1.28	
	5	-0.84	-0.52	-0.25	-0.52	0.00	0.52	0.52	0.84	1.28
	6	-1.28	-0.84	-0.52	-0.84	-0.52	0.00	0.84	0.84	1.28
	7	-1.28	-1.28	-0.84	-1.28	-0.52	-0.84	0.00	0.25	0.84
	8			-1.28	-1.28	-0.84	-0.84	-0.25	0.25	0.52
	9					-1.28	-1.28	-0.84	-0.52	0.00

card number	1	2	3	4	5	6	7	8	9
e) scale values	-0.60	-0.45	-0.30	-0.36	-0.11	0.12	0.55	0.60	0.79



Ranking



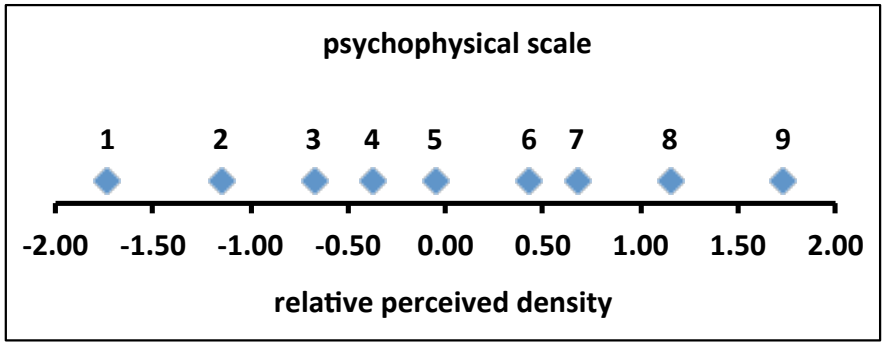
1. Sort the deck into suits. Set aside the diamonds.
2. Separately shuffle each of the spades, hearts, and clubs suits and place each pile face down on the table.
3. Pick up the spades piles and deal the cards face down in a horizontal row.
4. Without looking at the faces, arrange the cards by density so the card with the least dense pattern is on the left and the card with the most dense pattern is on the right.
5. Flip the cards in place and record the card numbers in the “ranking” spreadsheet.
6. Repeat steps 3-5 with the hearts and clubs piles.
7. Repeat steps 2-5 a second time to gather sufficient data.
8. Analyze the data using the spreadsheet.

FechDeck ranking method worksheet
v2.0 12/27/17 jaf

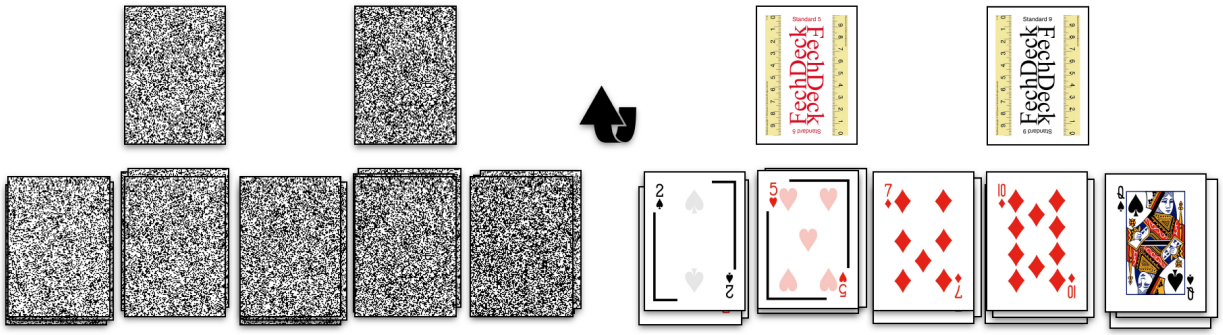
Instructions: For each ranked suit, enter the card numbers found at each rank position into the yellow boxes.

	rank positions								
	1	2	3	4	5	6	7	8	9
suit	card numbers								
spades	1	3	2	4	5	6	8	7	9
hearts	1	2	3	4	5	6	7	8	9
clubs	2	1	4	3	5	7	6	9	8
spades	1	2	3	5	4	6	7	8	9
hearts	1	3	2	4	5	6	8	7	9
clubs	2	1	4	3	5	7	6	9	8

mean rank	1.33	2.00	3.00	3.83	4.83	6.33	7.00	8.00	8.67
probability	0.96	0.88	0.75	0.65	0.52	0.33	0.25	0.13	0.04
-(z-score)	-1.73	-1.15	-0.67	-0.37	-0.05	0.43	0.67	1.15	1.73



Successive Categories



1. Place the jokers face down on the table at arms length with the red joker (standard 5) on the left and the black joker (standard 9) on the right and a card's with between them.
2. Remove the diamonds suit from the deck.
3. Shuffle the remaining cards and place the pile face down in front of you.
4. Starting with the top card, compare the pattern on each card to the standards, and sort them into the following five piles:

    - less dense than standard 5: to the left of standard 5
    - about as dense as standard 5: below standard 5
    - more dense than standard 5 and less dense than standard 9: between standards 5 and 9
    - about as dense as standard 9: below standard 9
    - more dense than standard 9: to the right of standard 9

5. Turn each pile over, and record the card numbers in the corresponding cells in the "successive_categories" spreadsheet.
6. Repeat steps 3-6 a second time to gather sufficient data.
7. Analyze the data using the spreadsheet.

FechDeck successive categories worksheet
v2.0, 12/27/17 jaf

Instructions: Enter the number of times each card appears in each category into the yellow boxes. Accumulate values across repetitions.

a) frequency (F) matrix

card number	category number 1	2	3	4	5
1	5	1			
2	4	2			
3	1	4	1		
4		4	2		
5		3	3		
6		3	2	1	
7		2	3	1	
8		1	2	3	
9			4	2	
10			2	2	2
11				4	2
12				3	3
13				1	5

b) cumulative frequency (CF) matrix

card number	category numbers 1	2	3	4	5
1	5	6	6	6	6
2	4	6	6	6	6
3	1	5	6	6	6
4	0	4	6	6	6
5	0	3	6	6	6
6	0	3	5	6	6
7	0	2	5	6	6
8	0	1	3	6	6
9	0	0	4	6	6
10	0	0	2	4	6
11	0	0	0	4	6
12	0	0	0	3	6
13	0	0	0	1	6

c) cumulative probability (CP) matrix

card number	category boundaries 1/2	2/3	3/4	4/5
1	0.83	1.00	1.00	1.00
2	0.67	1.00	1.00	1.00
3	0.17	0.83	1.00	1.00
4	0.00	0.67	1.00	1.00
5	0.00	0.50	1.00	1.00
6	0.00	0.50	0.83	1.00
7	0.00	0.33	0.83	1.00
8	0.00	0.17	0.50	1.00
9	0.00	0.00	0.67	1.00
10	0.00	0.00	0.33	0.67
11	0.00	0.00	0.00	0.67
12	0.00	0.00	0.00	0.50
13	0.00	0.00	0.00	0.17

d) cumulative normal (Z) matrix

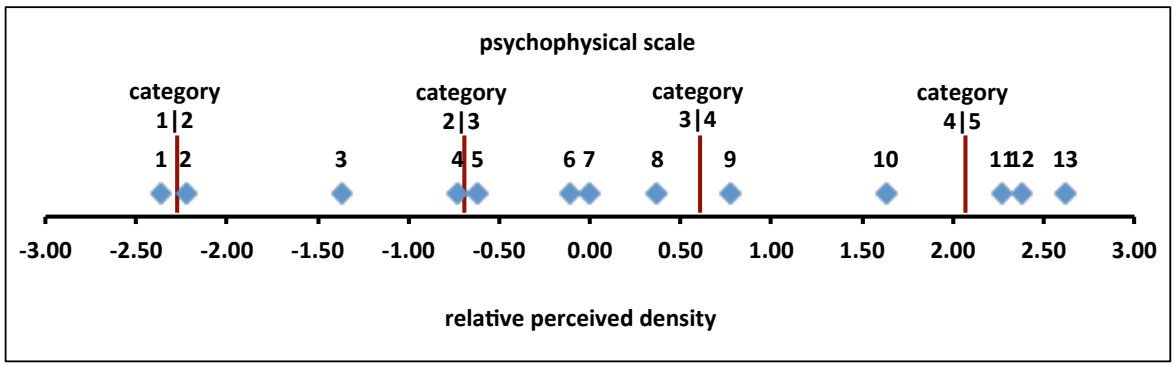
card number	category boundaries 1/2	2/3	3/4	4/5
1	0.97	3.00	3.00	3.00
2	0.43	3.00	3.00	3.00
3	-0.97	0.97	3.00	3.00
4	-3.00	0.43	3.00	3.00
5	-3.00	0.00	3.00	3.00
6	-3.00	0.00	0.97	3.00
7	-3.00	-0.43	0.97	3.00
8	-3.00	-0.97	0.00	3.00
9	-3.00	-3.00	0.43	3.00
10	-3.00	-3.00	-0.43	0.43
11	-3.00	-3.00	-3.00	0.43
12	-3.00	-3.00	-3.00	0.00
13	-3.00	-3.00	-3.00	-0.97

e) scale values

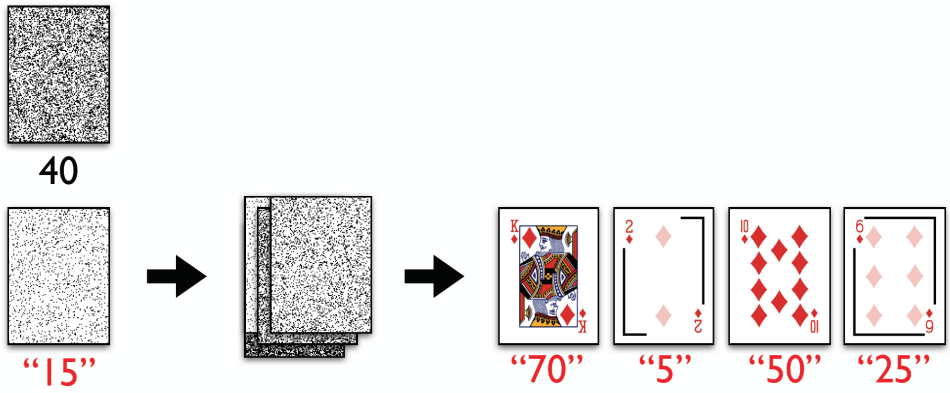
-2.36
-2.23
-1.37
-0.73
-0.62
-0.11
0.00
0.37
0.77
1.63
2.27
2.38
2.62

f) category boundary values

-2.275	-0.692	0.6104	2.0688



Magnitude Estimation



1. Place the red joker face down on the table as the "standard"
2. Remove the diamonds suit from the deck.
3. Shuffle the diamonds and place them face down below the standard as the "test" pile.
4. Assuming the pattern on the standard has a density of 40, estimate the density of the top card in the test pile.
5. Record this number and move the card to an "estimated" pile.
6. Repeat steps 4 and 5 for all the cards in the test pile.
7. Turn over the "estimated" pile and enter the previously recorded density estimates for each card into the appropriate cells in the "magnitude_estimation" spreadsheet.
8. Repeat steps 3-7 five times to gather sufficient data.
9. Analyze the data using the spreadsheet.

FechDeck magnitude estimation worksheet
v2.0, 12/27/17 jaf

Instructions: For each repetitionof the experiment, enter the estimated densities of each card into the yellow boxes.

		test card												
		A	2	3	4	5	6	7	8	9	10	J	Q	K
estimated density, repetition	1	5	10	15	30	35	25	40	80	45	60	70	75	80
	2	5	10	20	25	30	25	30	40	45	65	60	85	90
	3	5	10	15	25	30	35	40	40	50	50	60	55	90
	4	5	5	15	15	20	35	40	45	45	55	60	85	90
	5	5	10	15	20	25	20	35	40	45	45	55	55	60
	6	5	10	25	20	30	35	40	40	45	50	55	55	60

geomean est. dens.	5.00	8.91	17.14	21.97	27.91	28.50	37.29	45.79	45.80	53.76	59.80	66.96	77.09
numerical dens.	0.05	0.1	0.15	0.2	0.25	0.3	0.35	0.4	0.45	0.5	0.55	0.6	0.65