Supplemental Table 1

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
STEP 1				
1	Visual	Sticklebacks	1, 5, 7	Boughman JW. 2001. Divergent sexual selection enhances reproductive isolation in sticklebacks. *Nature* 411:944–48
2	Visual	Freshwater fishes	1, 5	Charlton RE, Wyman JA, McLaughlin JR, Roelofs WL. 1991. Identification of sex pheromone of tomato pinworm *Keiferia lycopersicella wals*. *J. Chem. Ecol.* 17:175–84
3	Visual	Saltwater fishes	1, 3	Cummings M, Partridge J. 2001. Visual pigments and optical habitats of surfperch (Embiotocidae) in the California kelp forest. *J. Comp. Physiol. A* 187:875–89
4	Visual	Saltwater fishes	1, 3	Cummings ME. 2004. Modelling divergence in luminance and chromatic detection performances across measured divergence in surfperch (Embiotocidae) habitats. *Vis. Res.* 44:1127–45
5	Visual	Fishes	1, 3, 5, 7	Cummings ME. 2007. Sensory trade-offs predict signal divergence in surfperch. *Evolution* 61:530–45
6	Auditory	Frogs	1, 7	Feng AS, Narins PM, Xu C-H, Lin W-Y, Qiu Q, et al. 2006. Ultrasonic communication in frogs. *Nature* 440:333–36
7	Visual	Lizards	1, 3, 7	Fleishman LJ. 1992. The influence of the sensory system and the environment on motion patterns in the visual displays of anoline lizards and other vertebrates. *Am. Nat.* 139:36–61
8	Visual	Lizards	1, 7	Fuller RC. 2002. Lighting environment predicts the relative abundance of male colour morphs in bluefin killifish (*Lucania goodei*) populations. *Proc. R. Soc. B* 269:1457–65
9	Visual	Fishes	1, 5	Fuller RC, Houle D, Travis J. 2005 Sensory bias as an explanation for the evolution of mate preferences. *Am. Nat.* 166:437–46
10	Visual	Birds	1, 7	Gomez D, Théry M. 2007. Simultaneous crypsis and conspicuousness in color patterns: comparative analysis of a neotropical rainforest bird community. *Am. Nat.* 169:S42–61
11	Olfactory	Moths	1, 5	Hendrikse A, Vos-Bunnemeyer E. 1987. Role of host-plant stimuli in sexual behavior of small ermine moths (*Yponomeuta*). *Ecol. Entomol.* 12:363–72

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
12	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Arnqvist G. 2011. Environmental correlates of diet in the swordtail characin (*Corynopoma riisei*, Gill). *Environ. Biol. Fish.* 92:159–66
13	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Amcoff M, Mann RP, Arnqvist G. 2012. Diversification of a food-mimicking male ornament via sensory drive. *Curr. Biol.* 22:1440–43
14	Auditory	Birds	1, 5	Langemann U, Gauger B, Klump GM. 1998. Auditory perception in the great tit: perception of signals in the presence and absence of noise. *Anim. Behav.* 56:763–69
15	Olfactory	Beetles	1, 5, 7	Larsson MC, Hedin J, Svensson GP, Tolasch T, Francke W. 2003. Characteristic odor of *Osmoderma eremita* identified as a male-released pheromone. *J. Chem. Ecol.* 29:575–87
16	Visual	Fishes	1, 5, 7	Maan ME, Cummings ME. 2012. Poison frog colors are honest signals of toxicity, particularly for bird predators. *Am. Nat.* 167:947–54
17	Visual	Birds	1, 7	Marchetti K. 1993. Dark habitats and bright birds illustrate the role of the environment in species divergence. *Nature* 362:149–52
18	Visual	Spiders	1, 5, 7	McClintock WJ, Uetz GW. 1996. Female choice and pre-existing bias: visual cues during courtship in two *Schizocosa* wolf spiders (Araneae: Lycosidae). *Anim. Behav.* 52:167–81
19	Visual	Freshwater fishes	1, 5, 7	McKinnon JS, Rundle HD. 2002. Speciation in nature: the threespine stickleback model systems. *Trends Ecol. Evol.* 17:480–88
20	Visual	Freshwater fishes	1, 7	Reimchen T. 1989. Loss of nuptial color in threespine sticklebacks (*Gasterosteus aculeatus*). *Evolution* 43:450–60
21	Visual	Spiders	1, 7	Scheffer SJ, Uetz GW, Stratton GE. 1996. Sexual selection, male morphology, and the efficacy of courtship signalling in two wolf spiders (Araneae: Lycosidae). *Behav. Ecol. Sociobiol.* 38:17–23
22	Visual	Fishes	1, 5, 7	Seehausen O, Terai Y, Magalhaes IS, Carleton KL, et al. 2008. Speciation through sensory drive in cichlid fish. *Nature* 455:620–26
23	Visual	Lizards	1, 7	Sigmund WR. 1983. Female preference for *Anolis carolinensis* males as a function of dewlap color and background coloration. *J. Herpetol.* 17:137–43

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
24	Auditory	Birds	1, 7	Slabbekoorn H, den Boer-Visser A. 2006. Cities change the songs of birds. *Curr. Biol.* 16:2326–31
25	Visual	Fishes	1, 5, 7	Smith C, Barber I, Wootton RJ, Chittka L. 2004. A receiver bias in the origin of three-spined stickleback mate choice. *Proc. R. Soc. B* 271:949–55
26	Visual	Lizards	1, 7	Stuart-Fox D, Moussalli A, Whiting MJ. 2007. Natural selection on social signals: signal efficacy and the evolution of chameleon display coloration. *Am. Nat.* 170:916–30
27	Visual	Lizards	1, 7	Stuart-Fox D., Moussalli A. 2008. Selection for social signalling drives the evolution of chameleon colour change. *PLoS Biol.* 6:e25
28	Auditory	Frogs	1, 5, 7	Sun L, Wilczynski W, Rand AS, Ryan M J. 2000. Trade-off in short- and long-distance communication in túngara (*Physalaemus pustulosus*) and cricket (*Acris crepitans*) frogs. *Behav. Ecol.* 11:102–9
29	Auditory	Birds	1, 7	Tobias JA, Aben J, Brumfield RT, Derryberry EP, Halfwerk W, et al. 2010. Song divergence by sensory drive in Amazonian birds. *Evolution* 64:2820–39
30	Visual	Birds	1, 7	Uy JAC, Stein AC. 2007. Variable visual habitats may influence the spread of colourful plumage across an avian hybrid zone. *J. Evol. Biol.* 20:1847–58
31	Auditory	Frogs	1, 5	Witte K, Farris HE, Ryan MJ, Wilczynski W. 2005. How cricket frog females deal with a noisy world: habitat-related differences in auditory tuning. *Behav. Ecol.* 16:571–79
STEP 2				
32	Visual	Freshwater fishes	2, 5	Barrett L. 2008. Some like it short. *Anim. Behav.* 76:259–60
33	Auditory	Birds	2, 7	Grant BR, Grant PR. Songs of Darwin's finches diverge when a new species enters the community. *Proc. Natl. Acad. Sci. USA* 107:20156–63
34	Visual	Spiders	2, 5	Hebets EA. 2003. Subadult experience influences adult mate choice in an arthropod: exposed female wolf spiders prefer males of a familiar phenotype. *Proc. Natl. Acad. Sci. USA* 100:13390–95

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
35	Visual	Birds	2, 5	ten Cate C, Verzijden MN, Etman E. 2006. Sexual imprinting can induce sexual preferences for exaggerated parental traits. *Curr. Biol.* 16:1128–32
36	Auditory	Birds	2, 5	Verzijden MN, Etman E, Van Heijningen C, Van Der Linden M, ten Cate C. 2007. Song discrimination learning in zebra finches induces highly divergent responses to novel songs. *Proc. R. Soc. B* 274:295–301
37	Olfactory/visual	Fishes	2, 5	Verzijden MN, Rosenthal GG. 2011. Effects of sensory modality on learned mate preferences in female swordtails. *Anim. Behav.* 82:557–62
38	Olfactory	Fishes	2, 5	Verzijden MN, Culumber ZW, Rosenthal GG. 2012. Opposite effects of learning cause asymmetric mate preferences in hybridizing species. *Behav. Ecol.* 23:1133–39
39	Visual	Birds	2, 5	Vos DR. 1995. The role of sexual imprinting for sex recognition in zebra finches: a difference between males and females. *Anim. Behav.* 50:645–53
40	Visual	Freshwater fishes	2, 5	Walling CA, Royle NJ, Lindstroem J, Metcalfe NB. 2008. Experience-induced preference for short-sworded males in the green swordtail, *Xiphophorus helleri*. *Anim. Behav.* 76:271–76
41	Visual	Birds	2, 5	Weisman R, Shackleton S, Ratcliffe L, Weary D, Boag P. 1994. Sexual preferences of female zebra finches: imprinting on beak colour. *Behaviour* 128:1–2
STEP 3				
3	Visual	Saltwater fishes	1, 3	Cummings M, Partridge J. 2001. Visual pigments and optical habitats of surfperch (Embiotocidae) in the California kelp forest. *J. Comp. Physiol. A* 187:875–89
4	Visual	Freshwater fishes	1, 3	Cummings ME. 2004. Modelling divergence in luminance and chromatic detection performances across measured divergence in surfperch (Embiotocidae) habitats. *Vis. Res.* 44:1127–45
5	Visual	Saltwater fishes	1, 3, 5, 7	Cummings ME. 2007. Sensory trade-offs predict signal divergence in surfperch. *Evolution* 61:530–45
7	Visual	Lizards	1, 3, 7	Fleishman LJ. 1992. The influence of the sensory system and the environment on motion patterns in the visual displays of anoline lizards and other vertebrates. *Am. Nat.* 139:36–61

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
12	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Arnqvist G. 2011. Environmental correlates of diet in the swordtail characin (*Corynopoma riisei*, Gill). *Environ. Biol. Fish.* 92:159–66
13	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Amcoff M, Mann RP, Arnqvist G. 2012. Diversification of a food-mimicking male ornament via sensory drive. *Curr. Biol.* 22:1440–43
42	Visual	Freshwater fishes	3, 5, 7	Arnqvist G, Kolm N. 2010. Population differentiation in the swordtail characin (*Corynopoma riisei*): a role for sensory drive? *J. Evol. Biol.* 23:1907–18
43	Olfactory	Spiders	3, 5	Cross FR, Jackson RR, Pollard SD. 2009. How blood-derived odor influences mate-choice decisions by a mosquito-eating predator. *Proc. Natl. Acad. Sci. USA* 106:19416–19
44	Visual	Fishes	3, 5, 7	Garcia CM, Ramirez E. 2005. Evidence that sensory traps can evolve into honest signals. *Nature* 434:501–5
45	Olfactory	Beewolves	3, 5, 7	Herzner G, Schmitt T, Linsenmair KE, Strohm E. 2005. Prey recognition by females of the European beewolf and its potential for a sensory trap. *Anim. Behav.* 70:1411–18
46	Visual	Birds	3, 5, 7	Madden JR, Tanner K. 2003. Preferences for coloured bower decorations can be explained in a nonsexual context. *Anim. Behav.* 65:1077–83
47	Olfactory	Lizards	3, 5, 7	Martin J, Lopez P. 2008. Female sensory bias may allow honest chemical signaling by male Iberian rock lizards. *Behav. Ecol. Sociobiol.* 62:1927–34
48	Visual	Birds	3, 7	Møller AP, Erritzøe J. 2010. Flight distance and eye size in birds. *Ethology* 116:458–65
49	Tactile	Water mites	3, 5, 7	Proctor HC. 1992. Sensory exploitation and the evolution of male mating behaviour: a cladistic test using water mites (Acari: Parasitengona). *Anim. Behav.* 44:745–52
50	Visual	Fishes	3, 5, 7	Rodd FH, Hughes KA, Grether GF, Baril CT. 2002. A possible non-sexual origin of mate preference: Are male guppies mimicking fruit? *Proc. R. Soc. Biol. B* 269:475–81
STEP 4				
51	Auditory	Antelopes	4, 7	Bro-Jorgensen J, Pangle WM. 2010. Male topi antelopes alarm snort deceptively to retain females for mating. *Am. Nat.* 176:E33–39

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
52	Visual	Crabs	4, 5, 7	Christy JH, Backwell PRY, Goshima S, Kreuter T. 2002. Sexual selection for structure building by courting male fiddler crabs: an experimental study of behavioral mechanisms. *Behav. Ecol.* 13:366–74
53	Visual	Crabs	4, 5, 6, 7	Christy JH. 1995. Mimicry, mate choice, and the sensory trap hypothesis. *Am. Nat.* 141:171–81
54	Visual	Crabs	4, 5, 7	Christy JH. 1988. Pillar function in the fiddler crab *Uca beebei* (II): competitive courtship signaling. *Ethology* 78:113–28
55	Visual	Crabs	4, 5, 6, 7	Christy JH, Backwell PR, Schober U. 2003a. Interspecific attractiveness of structures built by courting male fiddler crabs: experimental evidence of a sensory trap. *Behav. Ecol. Sociobiol.* 53:84–91
56	Visual	Crabs	4, 5, 6, 7	Christy JH, Baum JK, Backwell PRY. 2003b. Attractiveness of sand hoods built by courting male fiddler crabs, *Uca musica*: test of a sensory trap hypothesis. *Anim. Behav.* 66:89–94
57	Visual	Crabs	4, 5, 7	Christy JH, Salmon M. 1991. Comparative studies of reproductive behavior in mantis shrimps and fiddler crabs. *Am. Zool.* 31:329–37
58	Visual	Crabs	4, 5, 7	Christy JH, Rittschof D. 2011. Deception in visual and chemical communication in crustaceans. In *Chemical Communication in Crustaceans*, ed. T Breithaupt, M Thiel, pp. 313–33. New York: Springer
59	Auditory	Moths	4, 5, 7	Connor WE. 1987. Ultrasound: its role in the courtship of the arctiid moth, *Cycnia tenera*. *Cell. Mol. Life Sci.* 43:1029–31
60	Visual	Birds	4, 7	Heinsohn R, Legge S, Endler JA. 2005. Extreme reversed sexual dichromatism in a bird without sex role reversal. *Science* 309:617–19
61	Visual	No common name	4, 5, 7	Kasatani A, Wada K, Yusa Y, Christy JH. 2012. Courtship tactics by male *Ilyoplax pusilla* (Brachyura, Dotillidae). *J. Ethol.* 30:69–74
62	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Choe JC. 2007. A preference for a sexual signal keeps females safe. *PLoS One* 2:e422
63	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Dennenmoser S, Choe JC. 2009. The strength of a female mate preference increases with predation risk. *Proc. R. Soc. B* 276:775–80

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
64	Auditory	Moths	4, 7	Nakano R, Takanashi T, Skals N, Surlykke A, Ishikawa Y. 2010. Ultrasonic courtship songs of male Asian corn borer moths assist copulation attempts by making the females motionless. *Physiol. Entomol.* 35:76–81
STEP 5				
1	Visual	Sticklebacks	1, 5, 7	Boughman JW. 2001. Divergent sexual selection enhances reproductive isolation in sticklebacks. *Nature* 411:944–48
2	Visual	Freshwater fishes	1, 5	Charlton RE, Wyman JA, McLaughlin JR, Roelofs WL. 1991. Identification of sex pheromone of tomato pinworm *Keiferia lycopersicella wals*. *J. Chem. Ecol.* 17:175–84
5	Visual	Saltwater fishes	1, 3, 5, 7	Cummings ME. 2007. Sensory trade-offs predict signal divergence in surfperch. *Evolution* 61:530–45
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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
50	Visual	Fishes	3, 5, 7	Rodd FH, Hughes KA, Grether GF, Baril CT. 2002. A possible non-sexual origin of mate preference: Are male guppies mimicking fruit? *Proc. R. Soc. Biol. B* 269:475–81
52	Visual	Crabs	4, 5, 7	Christy JH, Backwell PRY, Goshima S, Kreuter T. 2002. Sexual selection for structure building by courting male fiddler crabs: an experimental study of behavioral mechanisms. *Behav. Ecol.* 13:366–74
53	Visual	Crabs	4, 5, 6, 7	Christy JH. 1995. Mimicry, mate choice, and the sensory trap hypothesis. *Am. Nat.* 141:171–81
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56	Visual	Crabs	4, 5, 6, 7	Christy JH, Baum JK, Backwell PRY. 2003b. Attractiveness of sand hoods built by courting male fiddler crabs, *Uca musica*: test of a sensory trap hypothesis. *Anim. Behav.* 66:89–94
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58	Visual	Crabs	4, 5, 7	Christy JH, Rittschof D. 2011. Deception in visual and chemical communication in crustaceans. In *Chemical Communication in Crustaceans*, ed. T Breithaupt, M Thiel, pp. 313–33. New York: Springer
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61	Visual	No common name	4, 5, 7	Kasatani A, Wada K, Yusa Y, Christy JH. 2012. Courtship tactics by male *Ilyoplax pusilla* (Brachyura, Dotillidae). *J. Ethol.* 30:69–74
62	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Choe JC. 2007. A preference for a sexual signal keeps females safe. *PLoS One* 2:e422
63	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Dennenmoser S, Choe JC. 2009. The strength of a female mate preference increases with predation risk. *Proc. R. Soc. B* 276:775–80

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
65	Auditory	Frogs	5	Akre KL, Ryan MJ. 2010. Complexity increases working memory for mating signals. *Curr. Biol.* 20:502–5
66	Auditory	Frogs	5	Akre KL, Farris HE, Lea AM, Page RA, Ryan MJ. 2011. Signal perception in frogs and bats and the evolution of mating signals. *Science* 333:751–52
67	Visual	Butterflies	5, 7	Briscoe AD, Bybee SM, Bernard GD, Yuan F, Sison-Mangus MP, et al. 2010. Positive selection of a duplicated UV-sensitive visual pigment coincides with wing pigment evolution in *Heliconius* butterflies. *Proc. Natl. Acad. Sci. USA* 107:3628–33
68	Visual	Crabs	5, 7	Christy JH, Backwell PRY, Goshima S, Kreuter T. 2002. Sexual selection for structure building by courting male fiddler crabs: an experimental study of behavioral mechanisms. *Behav. Ecol.* 13:366–74
69	Olfactory	Moths	5, 7	Coroiu I, Stan G, Tomescu N, Roman MC, Dragotel AT, et al. 1986. Attractivity and specificity of some pheromonal synthetic compounds in *Agrotis segetum* Lepidoptera Noctuidae. *Rev. Roum. Biol. Ser. Biol. Anim.* 31:109–18
70	Visual	Freshwater fishes	5, 7, 8	Cummings ME, Rosenthal GG, Ryan MJ. 2003. A private ultraviolet channel in visual communication. *Proc. R. Soc. B* 270:897–904
71	Auditory	Birds	5, 7	Eda-Fujiwara H, Satoh R, Miyamoto T. 2006. Song preferences by females: male song complexity and gene expression in the female brain. *Ornithol. Sci.* 5:23–29
72	Visual	Birds	5, 7	Endler JA, Westcott DA, Madden JR, Robson T. 2005. Animal visual systems and the evolution of color patterns: sensory processing illuminates signal evolution. *Evolution* 59:1795–818
73	Visual	Birds	5, 7	Endler JA, Endler LC, Doerr NR. 2010. Great bowerbirds create theaters with forced perspective when seen by their audience. *Curr. Biol.* 20:1679–84
74	Auditory	Katydids	5, 7	Greenfield MD, Roizen I. 1993. Katydid synchronous chorusing is an evolutionarily stable outcome of female choice. *Nature* 364:618–20

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
75	Visual	Birds	5, 7	Kelley LA, Endler JA. 2012. Illusions promote mating success in great bowerbirds. *Science* 335:335–38
76	Visual	Birds	5, 7	Kelley LA, Endler JA. 2012. Male great bowerbirds create forced perspective illusions with consistently different individual quality. *Proc. Natl. Acad. Sci. USA* 109:20980–85
77	Olfactory	Midges	5, 7	Lee CH, Lee HP. 1985. Studies on the sex pheromone and antennal ultrastructure of the pine gall midge *Thecodiplosis japonensis*. *Korean J. Entomol.* 15:31–40
78	Visual	Fishes	5, 7	MacLaren RD, Gagnon J, He R. 2011. Female bias for enlarged male body and dorsal fins in *Xiphophorus variatus*. *Behav. Process.* 87:197–202
79	Visual	Butterflies	5, 6, 7	Magnus D. 1958. Experimental analysis of some "overoptimal" sign-stimuli in the mating behavior of the fritillary butterfly *Argynnis paphia* (Lepidoptera: Nymphalidae). *Proc. Int. Congr. Entomol., 10th, Montreal*, Aug. 17–25, pp. 405–18. Ottawa: Mortimer Ltd.
80	Visual	Freshwater fishes	5, 6	Marler CA, Ryan MJ. 1997. Origin and maintenance of a female mating preference. *Evolution* 51:1244–48
81	Auditory	Frogs	5, 7	Phelps SM, Ryan MJ. 1998. Neural networks predict response biases of female túngara frogs. *Proc. R. Soc. B* 265:279–285
82	Auditory	Frogs	5, 7	Phelps, S. M, Ryan, M. J. 2000. History influences signal recognition: Neural network models of tungara frogs. *Proc. R. Soc. B* 267:1633–39
83	Visual	Freshwater fishes	5, 7	Rosenthal GG, Evans CS. 1998. Female preference for swords in *Xiphophorus helleri* reflects a bias for large apparent size. *Proc. Natl. Acad. Sci. USA* 95:4431–36
84	Auditory	Frogs	5, 7	Ryan MJ, Fox JH, Wilczynski W, Rand AS. 1990. Sexual selection for sensory exploitation in the frog *Physalaemus pustulosus*. *Nature* 343:66–67
85	Auditory	Frogs	5, 7	Ryan MJ, Rand AS. 1990. The sensory basis of sexual selection for complex calls in the túngara frog *Physalaemus pustulosus* sexual selection for sensory exploitation. *Evolution* 44:305–14

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
86	Auditory	Frogs	5, 7	Ryan MJ, Perrill SA, Wilczynski W. 1992. Auditory tuning and call frequency predict population-based mating preferences in the cricket frog, *Acris crepitans*. *Am. Nat.* 139:1370–83
87	Auditory	Katydids	5	Snedden WA, Greenfield MD. 1998. Females prefer leading males: relative call timing and sexual selection in katydid choruses. *Anim. Behav.* 56:1091–98
88	Visual	Spiders	5	Stalhandske P. 2002. Nuptial gifts of male spiders function as sensory traps. *Proc. R. Soc. B* 269:905–8
89	Auditory	Birds	5	Vallet E, Kreutzer M. 1995. Female canaries are sexually responsive to special song phrases. *Anim. Behav.* 49:1603–10
90	Gustatory	Cockroaches	5, 7	Wada-Katsumata A, Ozaki M, Yokohari F, Nishikawa M, Nishida R. 2009. Behavioral and electrophysiological studies on the sexually biased synergism between oligosaccharides and phospholipids in gustatory perception of nuptial secretion by the German cockroach. *J. Insect Physiol.* 55:742–50
91	Auditory	Frogs	5	Wilczynski W, Keddy-Hector AC, Ryan MJ. 1992. Call patterns and basilar papilla tuning in cricket frogs. I. Differences among populations and between sexes. *Brain Behav. Evol* 39:229–37
92	Auditory	Frogs	5, 6, 7	Wilczynski W, Rand AS, Ryan MJ. 2001. Evolution of calls and auditory tuning in the *Physalaemus pustulosus* species group. *Brain Behav. Evol.* 58:137–51
STEP 6				
53	Visual	Crabs	4, 5, 6, 7	Christy JH. 1995. Mimicry, mate choice, and the sensory trap hypothesis. *Am. Nat.* 141:171–81
55	Visual	Crabs	4, 5, 6, 7	Christy JH, Backwell PR, Schober U. 2003a. Interspecific attractiveness of structures built by courting male fiddler crabs: experimental evidence of a sensory trap. *Behav. Ecol. Sociobiol.* 53:84–91
56	Visual	Crabs	4, 5, 6, 7	Christy JH, Baum JK, Backwell PRY. 2003b. Attractiveness of sand hoods built by courting male fiddler crabs, *Uca musica*: test of a sensory trap hypothesis. *Anim. Behav.* 66:89–94

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
79	Visual	Butterflies	5, 6, 7	Magnus D. 1958. Experimental analysis of some "overoptimal" sign-stimuli in the mating behavior of the fritillary butterfly *Argynnis paphia* (Lepidoptera: Nymphalidae). *Proc. Int. Congr. Entomol., 10th, Montreal*, Aug. 17–25, pp. 405–18. Ottawa: Mortimer Ltd.
80	Visual	Freshwater fishes	5, 6	Marler CA, Ryan MJ. 1997. Origin and maintenance of a female mating preference. *Evolution* 51:1244–48
92	Auditory	Frogs	5, 6, 7	Wilczynski W, Rand AS, Ryan MJ. 2001. Evolution of calls and auditory tuning in the *Physalaemus pustulosus* species group. *Brain Behav. Evol.* 58:137–51
93	Visual	Freshwater fishes	6	Basolo AL. 1995a. A further examination of a pre-existing bias favouring a sword in the genus *Xiphophorus*. *Anim. Behav.* 50:365–75
94	Visual	Freshwater fishes	6, 7	Basolo AL. 1995b. Phylogenetic evidence for the role of a pre-existing bias in sexual selection. *Proc. R. Soc. B* 259:307–11
95	Olfactory	Pin worm	6	Charlton RE, Wyman JA, McLaughlin JR, Roelofs WL. 1991. Identification of sex pheromone of tomato pinworm *Keiferia lycopersicella wals*. *J. Chem. Ecol.* 17:175–84
96	Olfactory	Moths	6	Grant AJ, Mayer MS, Mankin RW. 1989. Responses from sensilla on antennae of male heliothis-zea to its major pheromone component and two analogs. *J. Chem. Ecol.* 15:2625–34
97	Visual	Birds	6, 7	Jones IL, Hunter FM. 1998. Heterospecific mating preferences for a feather ornament in least auklets. *Behav. Ecol.* 9:187–92
98	Olfactory	Freshwater fishes	6	McLennan DA, Ryan MJ. 2008. Female swordtails, *Xiphophorus continens*, prefer the scent of heterospecific males. *Anim. Behav.* 75:1731–37
99	Visual	Fishes	6	Owen MA, Rohrer K, Howard RD. 2012. Mate choice for a novel male phenotype in zebrafish, *Danio rerio*. *Anim. Behav.* 83:811–20
100	Visual	Freshwater fishes	6	Ryan MJ, Wagner WE. 1987. Asymmetries in mating preferences between species: female swordtails prefer heterospecific males. *Science* 236:595–97
101	Auditory	Frogs	6	Ryan MJ, Rand AS. 1993. Sexual selection and signal evolution: the ghost of biases past. *Philos. Trans. R. Soc. B* 340:187–95

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
102	Auditory	Frogs	6	Ryan MJ, Rand AS. 1995. Female responses to ancestral advertisement calls in túngara frogs. *Science* 269:390–92
103	Auditory	Frogs	6	Ryan MJ, Rand W, Hurd PL, Phelps SM, Rand AS. 2003. Generalization in response to mate recognition signals. *Am. Nat.* 161:380–94
104	Auditory	Frogs	6	Ryan MJ, Bernal XE, Rand AS. 2010. Female mate choice and the potential for ornament evolution in the túngara frog *Physalaemus pustulosus*. *Curr. Zool.* 56:343–57
105	Gustatory	Crickets	6	Sakaluk SK. 2000. Sensory exploitation as an evolutionary origin to nuptial food gifts in insects. *Proc. R. Soc. B* 267:339–43
106	Visual	Freshwater fishes	6	Schlupp I, Waschulewski M, Ryan MJ. 1999. Female preferences for naturally-occurring novel male traits. *Behaviour* 136:519–27
107	Auditory	Birds	6	Searcy WA. 1992. Song repertoire and mate choice in birds. *Am. Zool.* 32:71–80
108	Auditory	Frogs	6	Wilczynski W, Rand AS, Ryan MJ. 2001. Evolution of calls and auditory tuning in the *Physalaemus pustulosus* species group. *Brain Behav. Evol.* 58:137–51
STEP 7				
1	Visual	Sticklebacks	1, 5, 7	Boughman JW. 2001. Divergent sexual selection enhances reproductive isolation in sticklebacks. *Nature* 411:944–48
5	Visual	Saltwater fishes	1, 3, 5, 7	Cummings ME. 2007. Sensory trade-offs predict signal divergence in surfperch. *Evolution* 61:530–545
6	Auditory	Frogs	1, 7	Feng AS, Narins PM, Xu C-H, Lin W-Y, Qiu Q, et al. 2006. Ultrasonic communication in frogs. *Nature* 440:333–36
7	Visual	Lizards	1, 3, 7	Fleishman LJ. 1992. The influence of the sensory system and the environment on motion patterns in the visual displays of anoline lizards and other vertebrates. *Am. Nat.* 139:36–61
8	Visual	Lizards	1, 7	Fuller RC. 2002. Lighting environment predicts the relative abundance of male colour morphs in bluefin killifish (*Lucania goodei*) populations. *Proc. R. Soc. B* 269:1457–65
10	Visual	Birds	1, 7	Gomez D, Théry M. 2007. Simultaneous crypsis and conspicuousness in color patterns: comparative analysis of a neotropical rainforest bird community. *Am. Nat.* 169:S42–61

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
12	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Arnqvist G. 2011. Environmental correlates of diet in the swordtail characin (*Corynopoma riisei*, Gill). *Environ. Biol. Fish.* 92:159–66
13	Visual	Freshwater fishes	1, 3, 5, 7	Kolm N, Amcoff M, Mann RP, Arnqvist G. 2012. Diversification of a food-mimicking male ornament via sensory drive. *Curr. Biol.* 22:1440–43
15	Olfactory	Beetles	1, 5, 7	Larsson MC, Hedin J, Svensson GP, Tolasch T, Francke W. 2003. Characteristic odor of *Osmoderma eremita* identified as a male-released pheromone. *J. Chem. Ecol.* 29:575–87
16	Visual	Fishes	1, 5, 7	Maan ME, Cummings ME. 2012. Poison frog colors are honest signals of toxicity, particularly for bird predators. *Am. Nat.* 167:947–54
17	Visual	Birds	1, 7	Marchetti K. 1993. Dark habitats and bright birds illustrate the role of the environment in species divergence. *Nature* 362:149–52
18	Visual	Spiders	1, 5, 7	McClintock WJ, Uetz GW. 1996. Female choice and pre-existing bias: visual cues during courtship in two *Schizocosa* wolf spiders (Araneae: Lycosidae). *Anim. Behav.* 52:167–81
19	Visual	Freshwater fishes	1, 5, 7	McKinnon JS, Rundle HD. 2002. Speciation in nature: the threespine stickleback model systems. *Trends Ecol. Evol.* 17:480–88
20	Visual	Freshwater fishes	1, 7	Reimchen T. 1989. Loss of nuptial color in threespine sticklebacks (*Gasterosteus aculeatus*). *Evolution* 43:450–60
21	Visual	Spiders	1, 7	Scheffer SJ, Uetz GW, Stratton GE. 1996. Sexual selection, male morphology, and the efficacy of courtship signalling in two wolf spiders (Araneae: Lycosidae). *Behav. Ecol. Sociobiol.* 38:17–23
22	Visual	Fishes	1, 5, 7	Seehausen O, Terai Y, Magalhaes IS, Carleton KL, Mrosso HDJ, et al. 2008. Speciation through sensory drive in cichlid fish. *Nature* 455:620–26
23	Visual	Lizards	1, 7	Sigmund WR. 1983. Female preference for *Anolis carolinensis* males as a function of dewlap color and background coloration. *J. Herpetol.* 17:137–43
24	Auditory	Birds	1, 7	Slabbekoorn H, den Boer-VisserA. 2006. Cities change the songs of birds. *Curr. Biol.* 16:2326–31

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
25	Visual	Fishes	1, 5, 7	Smith C, Barber I, Wootton RJ, Chittka L. 2004. A receiver bias in the origin of three-spined stickleback mate choice. *Proc. R. Soc. B* 271:949–55
26	Visual	Lizards	1, 7	Stuart-Fox D, Moussalli A, Whiting MJ. 2007. Natural selection on social signals: signal efficacy and the evolution of chameleon display coloration. *Am. Nat.* 170:916–30
27	Visual	Lizards	1, 7	Stuart-Fox D, Moussalli A. 2008. Selection for social signalling drives the evolution of chameleon colour change. *PLoS Biol.* 6:e25
28	Auditory	Frogs	1, 5, 7	Sun L, Wilczynski W, Rand AS, Ryan MJ. 2000. Trade-off in short- and long-distance communication in túngara (*Physalaemus pustulosus*) and cricket (*Acris crepitans*) frogs. *Behav. Ecol.* 11:102–9
29	Auditory	Birds	1, 7	Tobias JA, Aben J, Brumfield RT, Derryberry EP, Halfwerk W, et al. 2010. Song divergence by sensory drive in amazonian birds. *Evolution* 64:2820–39
30	Visual	Birds	1, 7	Uy JAC, Stein AC. 2007. Variable visual habitats may influence the spread of colourful plumage across an avian hybrid zone. *J. Evol. Biol.* 20:1847–58
33	Auditory	Birds	2, 7	Grant BR, Grant PR. Songs of Darwin's finches diverge when a new species enters the community. *Proc. Natl. Acad. Sci. USA* 107:20156–63
42	Visual	Freshwater fishes	3, 5, 7	Arnqvist G, Kolm N. 2010. Population differentiation in the swordtail characin (*Corynopoma riisei*): a role for sensory drive? *J. Evol. Biol.* 23:1907–18
44	Visual	Fishes	3, 5, 7	Garcia CM, Ramirez E. 2005. Evidence that sensory traps can evolve into honest signals. *Nature* 434:501–5
45	Olfactory	Beewolves	3, 5, 7	Herzner G, Schmitt T, Linsenmair KE, Strohm E. 2005. Prey recognition by females of the European beewolf and its potential for a sensory trap. *Anim. Behav.* 70:1411–18
46	Visual	Birds	3, 5, 7	Madden JR, Tanner K. 2003. Preferences for coloured bower decorations can be explained in a nonsexual context. *Anim. Behav.* 65:1077–83

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
47	Olfactory	Lizards	3, 5, 7	Martin J, Lopez P. 2008. Female sensory bias may allow honest chemical signaling by male Iberian rock lizards. *Behav. Ecol. Sociobiol.* 62:1927–34
48	Visual	Birds	3, 7	Møller AP, Erritzøe J. 2010. Flight distance and eye size in birds. *Ethology* 116:458–65
49	Tactile	Water mites	3, 5, 7	Proctor HC. 1992. Sensory exploitation and the evolution of male mating behaviour: a cladistic test using water mites (Acari: Parasitengona). *Anim. Behav.* 44:745–52
50	Visual	Fishes	3, 5, 7	Rodd FH, Hughes KA, Grether GF, Baril CT. 2002. A possible non-sexual origin of mate preference: Are male guppies mimicking fruit? *Proc. R. Soc. B* 269:475–81
51	Auditory	Antelopes	4, 7	Bro-Jorgensen J, Pangle WM. 2010. Male topi antelopes alarm snort deceptively to retain females for mating. *Am. Nat.* 176:E33–39
52	Visual	Crabs	4, 5, 7	Christy JH, Backwell PRY, Goshima S, Kreuter T. 2002. Sexual selection for structure building by courting male fiddler crabs: an experimental study of behavioral mechanisms. *Behav. Ecol.* 13:366–74
53	Visual	Crabs	4, 5, 6, 7	Christy JH. 1995. Mimicry, mate choice, and the sensory trap hypothesis. *Am. Nat.* 141:171–81
54	Visual	Crabs	4, 5, 7	Christy JH. 1988. Pillar function in the fiddler crab *Uca beebei* (II): competitive courtship signaling. *Ethology* 78:113–28
55	Visual	Crabs	4, 5, 6, 7	Christy JH, Backwell PR, Schober U. 2003a. Interspecific attractiveness of structures built by courting male fiddler crabs: experimental evidence of a sensory trap. *Behav. Ecol. Sociobiol.* 53:84–91
56	Visual	Crabs	4, 5, 6, 7	Christy JH, Baum JK, Backwell PRY. 2003b. Attractiveness of sand hoods built by courting male fiddler crabs, *Uca musica*: test of a sensory trap hypothesis. *Anim. Behav.* 66:89–94
57	Visual	Crabs	4, 5, 7	Christy JH, Salmon M. 1991. Comparative studies of reproductive behavior in mantis shrimps and fiddler crabs. *Am. Zool.* 31:329–37
58	Visual	Crabs	4, 5, 7	Christy JH, Rittschof D. 2011. Deception in visual and chemical communication in crustaceans. In *Chemical Communication in Crustaceans*, ed. T Breithaupt, M Thiel, pp. 313–33. New York: Springer

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
59	Auditory	Moths	4, 5, 7	Connor WE. 1987. Ultrasound: its role in the courtship of the arctiid moth, *Cycnia tenera*. *Cell. Mol. Life Sci.* 43:1029–31
60	Visual	Birds	4, 7	Heinsohn R, Legge S, Endler JA. 2005. Extreme reversed sexual dichromatism in a bird without sex role reversal. *Science* 309:617–19
61	Visual	No common name	4, 5, 7	Kasatani A, Wada K, Yusa Y, Christy JH. 2012. Courtship tactics by male *Ilyoplax pusilla* (Brachyura, Dotillidae). *J. Ethol.* 30:69–74
62	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Choe JC. 2007. A preference for a sexual signal keeps females safe. *PLoS One* 2:e422
63	Visual	Crabs	4, 5, 7	Kim TW, Christy JH, Dennenmoser S, Choe JC. 2009. The strength of a female mate preference increases with predation risk. *Proc. R. Soc. B* 276:775–80
64	Auditory	Moths	4, 7	Nakano R, Takanashi T, Skals N, Surlykke A, Ishikawa Y. 2010. Ultrasonic courtship songs of male Asian corn borer moths assist copulation attempts by making the females motionless. *Physiol. Entomol.* 35:76–81
67	Visual	Butterflies	5, 7	Briscoe AD, Bybee SM, Bernard GD, Yuan F, Sison-Mangus MP, et al. 2010. Positive selection of a duplicated UV-sensitive visual pigment coincides with wing pigment evolution in *Heliconius* butterflies. *Proc. Natl. Acad. Sci. USA* 107:3628–33
68	Visual	Crabs	5, 7	Christy JH, Backwell PRY, Goshima S, Kreuter T. 2002. Sexual selection for structure building by courting male fiddler crabs: an experimental study of behavioral mechanisms. *Behav. Ecol.* 13:366–74
69	Olfactory	Moths	5, 7	Coroiu I, Stan G, Tomescu N, Roman MC, Dragotel AT, et al. 1986. Attractivity and specificity of some pheromonal synthetic compounds in *Agrotis segetum* Lepidoptera Noctuidae. *Rev. Roum. Biol. Ser. Anim.* 31:109–18
70	Visual	Freshwater fishes	5, 7, 8	Cummings ME, Rosenthal GG, Ryan MJ. 2003. A private ultraviolet channel in visual communication. *Proc. R. Soc. B.* 270:897–904
71	Auditory	Birds	5, 7	Eda-Fujiwara H, Satoh R, Miyamoto T. 2006. Song preferences by females: male song complexity and gene expression in the female brain. *Ornithol. Sci.* 5:23–29

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
72	Visual	Birds	5, 7	Endler JA, Westcott DA, Madden JR, Robson T. 2005. Animal visual systems and the evolution of color patterns: sensory processing illuminates signal evolution. *Evolution* 59:1795–818
73	Visual	Birds	5, 7	Endler JA, Endler LC, Doerr NR. 2010. Great bowerbirds create theaters with forced perspective when seen by their audience. *Curr. Biol.* 20:1679–84
74	Auditory	Katydids	5, 7	Greenfield MD, Roizen I. 1993. Katydid synchronous chorusing is an evolutionarily stable outcome of female choice. *Nature* 364:618–20
75	Visual	Birds	5, 7	Kelley LA, Endler JA. 2012. Illusions promote mating success in great bowerbirds. *Science* 335:335–38
76	Visual	Birds	5, 7	Kelley LA, Endler JA. 2012. Male great bowerbirds create forced perspective illusions with consistently different individual quality. *Proc. Natl. Acad. Sci. USA* 109:20980–85
77	Olfactory	Midges	5, 7	Lee CH, Lee HP. 1985. Studies on the sex pheromone and antennal ultrastructure of the pine gall midge *Thecodiplosis japonensis*. *Korean J. Entomol.* 15:31–40
78	Visual	Fishes	5, 7	MacLaren RD, Gagnon J, He R. 2011. Female bias for enlarged male body and dorsal fins in *Xiphophorus variatus*. *Behav. Process.* 87:197–202
79	Visual	Butterflies	5, 6, 7	Magnus D. 1958. Experimental analysis of some "overoptimal" sign-stimuli in the mating behavior of the fritillary butterfly *Argynnis paphia* (Lepidoptera: Nymphalidae). *Proc. Int. Congr. Entomol., 10th, Montreal*, Aug. 17–25, pp. 405–18. Ottawa: Mortimer Ltd.
81	Auditory	Frogs	5, 7	Phelps SM, Ryan MJ. 1998. Neural networks predict response biases of female túngara frogs. *Proc. R. Soc. B* 265:279–85
82	Auditory	Frogs	5, 7	Phelps SM, Ryan MJ. 2000. History influences signal recognition: neural network models of tungara frogs. *Proc. R. Soc. B* 267:1633–39
83	Visual	Freshwater fishes	5, 7	Rosenthal GG, Evans CS. 1998. Female preference for swords in *Xiphophorus helleri* reflects a bias for large apparent size. *Proc. Natl. Acad. Sci. USA* 95:4431–36

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Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
84	Auditory	Frogs	5, 7	Ryan MJ, Fox JH, Wilczynski W, Rand AS. 1990. Sexual selection for sensory exploitation in the frog *Physalaemus pustulosus*. *Nature* 343:66–67
85	Auditory	Frogs	5, 7	Ryan MJ, Rand AS. 1990. The sensory basis of sexual selection for complex calls in the túngara frog *Physalaemus pustulosus* sexual selection for sensory exploitation. *Evolution* 44:305–14
86	Auditory	Frogs	5, 7	Ryan MJ, Perrill SA, Wilczynski W. 1992. Auditory tuning and call frequency predict population-based mating preferences in the cricket frog, *Acris crepitans*. *Am. Nat.* 139:1370–83
90	Gustatory	Cockroaches	5, 7	Wada-Katsumata A, Ozaki M, Yokohari F, Nishikawa M, Nishida R. 2009. Behavioral and electrophysiological studies on the sexually biased synergism between oligosaccharides and phospholipids in gustatory perception of nuptial secretion by the German cockroach. *J. Insect Physiol.* 55:742–50
92	Auditory	Frogs	5, 6, 7	Wilczynski W, Rand AS, Ryan MJ. 2001. Evolution of calls and auditory tuning in the *Physalaemus pustulosus* species group. *Brain Behav. Evol.* 58:137–51
94	Visual	Freshwater fishes	6, 7	Basolo AL. 1995b. Phylogenetic evidence for the role of a pre-existing bias in sexual selection. *Proc. R. Soc. B* 259:307–11
97	Visual	Birds	6, 7	Jones IL, Hunter FM. 1998. Heterospecific mating preferences for a feather ornament in least auklets. *Behav. Ecol.* 9:187–92
109	Visual	Freshwater fishes	7	Basolo AL. 1990b. Female preference predates the evolution of the sword in swordtail fish. *Science* 250:808–10
110	Auditory	Birds	7	Clark CJ, Feo TJ. 2010. Why do calypte hummingbirds “sing” with both their tail and their syrinx? An apparent example of sexual sensory bias. *Am. Nat.* 175:27–37
111	Olfactory	Worms	7	Zhu J, Polavarapu S, Park K-C, Garvey C, Mahr D, et al. 2009. Reidentification of pheromone composition of *Sparganothis sulfureana* (Clemens) and evidence of geographic variation in male responses from two US states. *J. Asia-Pac. Entomol.* 12:247–52

(*Continued*)

Supplemental Table 1 (*Continued*)

See Figure 1	Sensory mode	Common name	Steps in perceptual bias model from Figure 1	Reference
STEP 8				
70	Visual	Freshwater fishes	5, 7, 8	Cummings ME, Rosenthal GG, Ryan MJ. 2003. A private ultraviolet channel in visual communication. *Proc. R. Soc. B* 270:897–904
112	Visual	Frogs	8	Crothers L, Cummings ME. 2013 Warning signal brightness variation: sexual selection may work under the radar of natural selection in populations of a polytypic poison frog. *Am. Nat.* 181:E1–9
113	Visual	Fishes	8	Endler JA. 1978. A predator's view of animal color patterns. *Evol. Biol.* 11:319–64
114	Visual	Flies	8	Hornstein E, O'Carroll D, Anderson J, Laughlin S. 2000. Sexual dimorphism matches photoreceptor performance to behavioural requirements. *Proc. R. Soc. B* 267:2111–17
STEP 10				
115	Visual	Birds	10	Endler JA, Thery M. 1996. Interacting effects of lek placement, display behavior, ambient light, and color patterns in three neotropical forest-dwelling birds. *Am. Nat.* 148:421–52
116	Visual	Birds	10	Stein AC, Uy JAC. 2006. Plumage brightness predicts male mating success in the lekking golden-collared manakin, *Manacus vitellinus*. *Behav. Ecol.* 17:41–47
117	Visual	Birds	10	Uy JAC, Endler JA. 2004. Modification of the visual background increases the conspicuousness of golden-collared manakin displays. *Behav. Ecol.* 15:1003–10

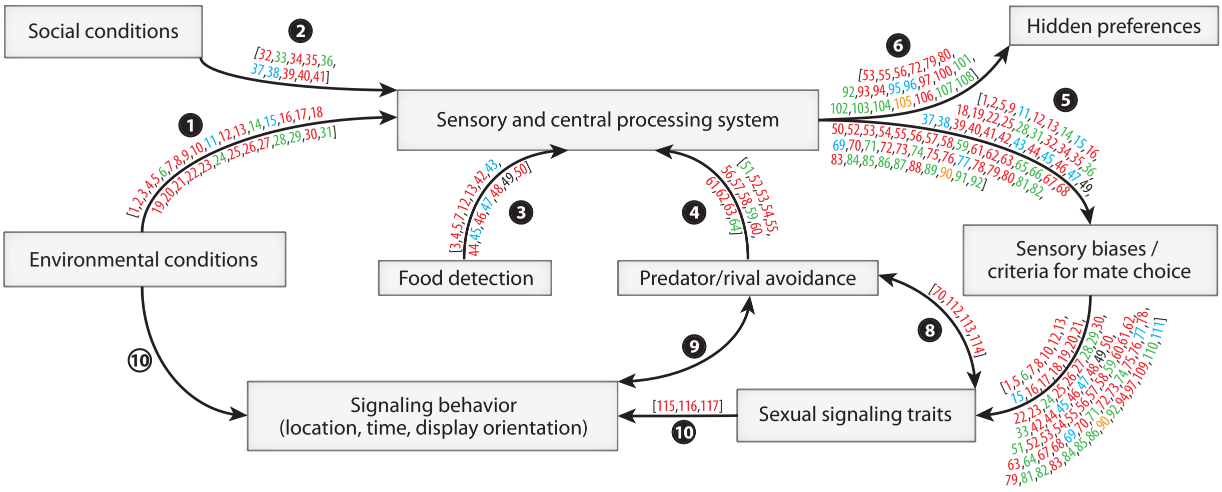

Figure 1

Stages and evidence of signal elaboration via perceptual bias mode of sexual selection. A flowchart modified from the sensory drive model by Endler & Basolo (1998). Species-specific habitats have unique environmental properties imposing selective constraints on sensory systems (*step 1*). Social conditions (often early in development) may influence perceptual processes or responses of females toward specific stimuli (e.g., peak shift phenomena, *step 2*). Sensory systems undergo further selection for detection of specific targets necessary for survival, such as prey (*step 3*) and predators (*step 4*). Sensory, cognitive, and social mechanisms combine to influence the target properties to which females are likely most attentive as well as determine the level of elaboration necessary to generate a response in a mate choice context (via receptor biases, Weber's Law, release from habituation, stimulus generalization, complexity advantages, and peak shift processes, *step 5*). These perceptual biases influence preferences by way of increased detectability, stimulation, or attention of target for particular stimulus features. Some of these features are absent in conspecific male phenotypes, and the preference for such features are uncovered only through experimentation (hidden preferences, *step 6*). Female perceptual biases influence the evolution of male sexual signaling traits (*step 7*) via the communication advantage males may gain with signaling features that are more detectable, memorable, or stimulating for the female observer. Male signaling features may also be shaped by the need to avoid detection by the perceptual biases of predators (*step 8*) or rivals due to intrasexual competition. Predator avoidance may impose a selective constraint on the time and place of signaling display (*step 9*). Furthermore, male selection of display location, timing, and specific behavioral features may be influenced by the perceptual biases of the female viewer (*step 10*). Colored numbers at each step refer to the reference number of a research study that presented evidence for that particular stage of the perceptual bias model. References are color coded by sensory modality: visual in red, auditory in green, olfaction in blue, gustatory in yellow, tactile in black.