

ELECTRONIC APPENDIX

This is the Electronic Appendix to the article

Fear in animals: a meta-analysis and review of risk assessment

by

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Electronic appendices are refereed with the text; however, no attempt is made to impose a uniform editorial style on the electronic appendices.

SECTION A: Factors investigated

(i) Predatory effects

Many different aspects of a predator's approach toward prey have been studied for their role in influencing prey flight initiation distance. The speed at which the predator approaches is commonly included in analyses, and while, in reptiles, faster approaches nearly always elicited flight at a greater distance, the trend in other taxa was less clear. We included studies that measured the role of directness of approach on flight initiation distance. This factor is usually broken up into direct approaches or indirect approaches where the predator tangentially approaches the prey with a set bypass distance. Finally, we included studies examining the effect of relative predator size (e.g., large vs. small predator) on flight initiation distance where the predator is classified simply as small or large. All three of these categories were then analyzed together to determine the overall importance of predator traits on the evolution of fear in prey. We identified high-risk approaches (fast, direct, large predator) as the treatment and low risk approaches as the control (i.e., positive r values indicate that higher risk approaches led to animals initiating flight at greater distances).

(ii) Refuge distance

The distance between an individual prey animal and safe locations has been shown both empirically (see Appendix B) and using theoretical models (Kramer & Bonenfant 1997) to play a significant role in the decision to flee. We examined studies that correlated distance to nearest refuge with flight initiation distance to determine the strength of effect it has on flight decisions. Positive r -values indicate that longer distances to refuge lead to animals initiating flight at greater distances.

(iii) Group size

In their initial review of flight initiation distance, Ydenberg & Dill (1986) found no consistent effect of group sizes on flight distance and concluded that the large number of other species-specific influences on group size likely reduces our ability to make cross-taxa generalizations about its effect on flight initiation distance. We analysed studies where group size was compared with flight initiation distance to determine if (1) there is, indeed, a general effect of group size on flight, and (2) if there are significant effects within taxa that shed light on the role of other factors in its relationship with the decision to flee. Positive r -values indicate that animals in larger groups initiate flight at greater distances.

(iv) Prey defenses

We included studies that compared species with varying degrees of morphological defenses or varying degrees of morphological crypsis. The perception of risk by cryptic or heavily armored prey likely plays a large role in determining what strategy to use when confronted with a potential predator (Ydenberg & Dill 1986). After each factor

was analyzed individually, we combined both types of studies into a single meta-analysis. We identified species lacking in crypsis or morphological defenses as being at higher risk: positive r -values indicate that these unprotected animals initiate flight at greater distances.

(v) Temperature in reptiles

Air and body temperature have been shown to have profound impacts on reptile physiology and behaviour, specifically, maximum escape speed. Hertz *et al.* (1982) found that at high body temperatures, two *Agamid* lizard species flee rapidly from predators but at lower body temperatures, they show reduced speeds, hold their ground, and attack predators aggressively. We examined the effect of temperature on cold-blooded organism, specifically reptiles. We included studies that measured the effects of air, body, substrate or water temperature on reptile flight initiation distance. Positive r -values indicate that colder reptiles allow closer approach than warmer reptiles.

(vi) Experience with and habituation to predators

We included studies that measured the degree of experience the prey had with the predator or predators in general. Studies were divided into two categories for meta-analyses. First, we analyzed studies that compared flight initiation distances in populations of prey that differed in the relative density of predators around them. Low-density areas were labeled as treatment areas and high-density areas as control areas: positive r -values indicate that prey fled sooner (i.e., had greater flight initiation distances) in areas with low predator density. Second, we analyzed studies that did multiple sequential approaches towards prey and compared the flight initiation distance from the first approach to that measured on subsequent approaches. We categorized the second approach as high risk and the first approach as low risk. Thus, positive r -values indicate that animals tolerated closer approaches on the first approach relative to subsequent approaches. After each factor was analyzed individually, we combined both types of studies into a single meta-analysis.

SECTION B: Predatory factors contributing to perceived risk and their effects on flight initiation distance

Taxa	Prey Species	Predator(s)	Effect on Flight Distance	N	r	Source
Predator Approach Speed						
I	Ocean skater: <i>Halobates robustus</i>	White rectangle	No effect			Treherne & Foster 1980
F	Damselfish: <i>Chromis cyanea</i>	Circle Model	No effect	15	.24	Hurley & Hartline 1974
		Square Model	No effect	9	.20	
F	Zebra danio: <i>Brachydanio rerio</i>	Largemouth bass	Fast > Slow approach	12	.69	Dill 1973, 1974a
F	Reef-fish species	Grey shark	Fast > Slow approach			Eibl-Eibesfeldt 1965
R	Lizard: <i>Anolis lineatopus</i>	Human with stick	Fast > Slow approach			Rand 1964
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	Fast > Slow approach	52	.66	Cooper 1997b
R	Eastern brownsnake: <i>Pseudonaja textiles</i>	Human	No effect			Whitaker & Shine 1999
R	Desert iguana: <i>Dipsosaurus dorsalis</i>	Human	Fast > Slow approach	20	.82	Cooper 2003b
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	Fast > Slow approach	37	.71	Cooper 2003c
R	Bonaire whiptail lizard: <i>Cnemidophorus murinus</i>	Human	Fast > Slow approach	50	.61	Cooper et al. 2003
B	New Zealand dotterel: <i>Charadrius obscurus</i>	Human	Fast > Slow approach	15	.36	Lord et al. 2001
M	Gazelle spp: <i>Gazella thomsonii</i> ; <i>G. granti</i>	African wild dog	Run > walk > stalk			Estes & Goddard 1967
M	Enclosed Merino sheep: <i>Ovis aries</i>	Human	No effect	20	-.44	Hutson 1982
M	Woodchuck: <i>Marmota monax</i>	Human	No effect	85	.01	Bonenfant & Kramer 1996
Predator Size						
F	Zebra danio: <i>Brachydanio rerio</i>	Largemouth bass	Large > Small predator: speed 1	12	.43	Dill 1974a
			Large > Small predator: speed 2	12	.21	
			Large > Small predator: speed 3	12	.30	
F	Bicolor damselfish: <i>Pomacentrus partitus</i>	Atlantic trumpetfish	Large > Small predator	64	.23	Helfman & Winkelman 1997
F	Blue chromis damselfish: <i>Chromis cyanea</i>	Plastic model: bar jack	Large > Small predator	38	.41	Hurley & Hartline 1974
F	Goby: <i>Cryptocentrus steinitzi</i>	Model Serranid fish	Large > Small predator	20	.64	Karplus & Tuvia 1979
R	Black iguana: <i>Ctenosaura similes</i>	Human wearing eye mask	Large > Small eye mask	119	.33	Burger et al. 1991
Predator Intent						
F	Bicolor damselfish: <i>Pomacentrus partitus</i>	Atlantic trumpetfish	No effect of predator orientation			Helfman & Winkelman 1997

Directness of Approach

R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	Indirect < Direct approach	36	.47	Cooper 1997b
R	Zebra-tailed lizard: <i>Callisaurus draconoides</i>	Human	Indirect < Direct approach			Bulova 1994
R	Greater earless lizard: <i>Cophosaurus texanus</i>	Human	Indirect < Direct approach			Bulova 1994
R	Black iguana: <i>Ctenosaura similes</i>	Human	Indirect < Direct approach: a*	86	.20	Burger & Gochfeld 1990
			Indirect < Direct approach: b	31	.23	
			Indirect < Direct approach: c	57	.30	
R	Desert iguana: <i>Dipsosaurus dorsalis</i>	Human	Indirect < Direct approach	9	.16	Cooper 2003b
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	Indirect < Direct approach	20	.69	Cooper 2003c
R	Bonaire whiptail lizard: <i>Cnemidophorus murinus</i>	Human	Indirect < Direct approach: fast	27	.28	Cooper et al. 2003
			Indirect < Direct approach: slow	22	-.45	
B	Herring gull: <i>Larus argentatus</i>	Human	Indirect < Direct approach	22	.22	Burger & Gochfeld 1981
B	Great black-backed gull: <i>Larus marinus</i>	Human	No effect (human naïve population)	26	.22	Burger & Gochfeld 1981
M	Gazelle spp: <i>Gazella thomsonii</i> ; <i>G. granti</i>	African wild dog	Indirect < Direct approach			Estes & Goddard 1967
Predator Species/Type						
I	Brown shrimp: <i>Crangon crangon</i>	Cod	Cod < Wooden rod			Arnott et al. 1999
I	Hermit crab: <i>Pagurus acadianus</i>	Model lobster	Sponge < Lobster model			Scarratt & Godin 1992
F	Blue chromis damselfish: <i>Chromis cyanea</i>	Model bar jack	Dark model > Light model			Hurley & Hartline 1974
			No effect of model shape			
R	Black iguana: <i>Ctenosaura similes</i>	Human face	Hair over face < Face exposed			Burger & Gochfeld 1993
			Male face < Female face			
R	Ground skink: <i>Scincella lateralis</i>	Model lizard Mounted blue jay Mounted crow	No effect of predator species			Smith 1997
R	Eastern brownsnake: <i>Pseudonaja textiles</i>	Human	No effect of shade of clothes			Whitaker & Shine 1999
B	Herring gull: <i>Larus argentatus</i>	Human Wolfhound	Wolfhound > Human			Goethe 1937 (as cited in Hediger 1964)
B	Wigeon: <i>Anas penelope</i>	Boats, wind-surfers	Stationary boat < mobile boat < wind -surfers			Madsen et al. 1992 (as cited in Fox & Madsen 1997)
B	New Zealand dotterel: <i>Charadrius obscurus</i>	Human, Dog	Dog > Human			Lord et al. 2001
B	Brown pelican: <i>Pelecanus occidentalis</i>	Human, Boat	Boat < Human			Rodgers & Smith 1995
			Boat = Human			Rodgers & Smith 1997
B	Double-crested cormorant: <i>Phalacrocorax auritus</i>	Human, Boat	Boat < Human			Rodgers & Smith 1995

B	Great blue heron: <i>Ardea herodias</i>	Human, Boat	Boat < Human	Rodgers & Smith 1995
B	Tricolored heron: <i>Egretta tricolor</i>	Human, Boat	Boat < Human	Rodgers & Smith 1995
B	Great egret: <i>Casmerodius albus</i>	Human, Boat	Boat = Human	Rodgers & Smith 1995
B	Anhinga: <i>Anhinga anhinga</i>	Motor boat, Canoe	Motor boat = canoe	Rodgers & Smith 1995
B	Sanderling: <i>Calidris alba</i>	Human, ATV	No effect	Rodgers & Smith 1997
B	Willet: <i>Catoptrophorus semipalmatus</i>	Human, Car, ATV	Car = Human; Human = ATV; Car > ATV	Rodgers & Smith 1997
B	Ring-billed gull: <i>Larus delawarensis</i>	Human, Car, ATV	Human = ATV; Car < ATV; Car < Human	Rodgers & Smith 1997
B	American kestrel: <i>Falco sparverius</i>	Human, Car	No effect	Holmes et al. 1993
B	Merlin: <i>F. columbarius</i>	Human, Car	No effect	Holmes et al. 1993
B	Prarie falcon: <i>F. mexicanus</i>	Human, Car	No effect	Holmes et al. 1993
B	Rough-legged hawk: <i>Buteo lagopus</i>	Human, Car	Human > Car	Holmes et al. 1993
B	Golden eagle: <i>Aguila chrysaetos</i>	Human, Car	Human > Car	Holmes et al. 1993
B	Ferruginous hawk: <i>Buteo regalis</i>	Human, Car	Car > Human	Holmes et al. 1993
M	Alpine marmot: <i>Marmota marmota</i>	Human, Dog	Human + Dog < Human only	Louis & Le Berre 2000
M	Thomson's gazelle: <i>Gazella thomsoni</i>	5 predators	Jackal < Hyena < Lion < Cheetah < Wild Dog	Walther 1969
M	Giraffe: <i>Giraffa camelopardalis</i>	Human, Automobile	Human > Automobile	Kearton 1929

Number of Predators

M	Thomson's gazelle: <i>Gazella thomsoni</i>	Hyena	Solitary hyena < Pack	Walther 1969
I	Lotic mayfly: <i>Baetis tricaudatus</i>	Longnose dace Stonefly	No effect	Scrimgeour et al. 1997

Starting Distance of Approaching Threat

B	68 Australian & Tasmanian bird spp.	Human	Positive Correlation: 64 of 68 spp.	Blumstein 2003
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I = Invertebrate, F = Fish, B = Bird, R = Reptile, M = Mammal. If no *N* or *r*-value is given, sufficient data to calculate effect size was not reported, and the study was not included in the meta-analysis. No meta-analyses were conducted on "Predator Intent," "Predator Species/Type," "Number of Predators," "or Starting Distance of Approaching Threat," and these studies were not included in the "Predatory effects (combined)" meta-analysis. *Burger & Gochfeld 1990: a = heavy human exposure, b = minimal exposure, c = no exposure

SECTION C: Environmental and ecological factors influencing flight initiation distance

Taxa	Prey Species	Predator(s)	Effect on Flight Distance	N	r	Source
Group Size						
I	Water strider: <i>Gerris remigis</i>	Conspecific adults	Convex quadratic relationship	72	-.49	Dill & Ydenberg 1987
I	Ocean skater: <i>Halobates robustus</i>	White rectangle	Large groups > Small groups			Treherne & Foster 1980
F	Banded killifish: <i>Fundulus diaphanous</i>	Model white perch	No effect			Godin & Morgan 1985
F	Fathead minnow: <i>Pimephales promelas</i>	Yellow Perch	No effect	16	-.20	Abrahams 1995
F	Brook stickleback: <i>Culea inconstans</i>	Yellow Perch	Large groups < Small groups	11	-.35	Abrahams 1995
F	Atlantic salmon: <i>Salmo salar</i>	Cod	Solitary < Groups			Handeland et al. 1996
F	Bicolor damselfish: <i>Pomacentrus partitus</i>	Atlantic trumpetfish	Solitary > Groups			Helfman & Winkelman 1997
F	Spottail shiner: <i>Notropis hudsonius</i>	Fishing lure	Solitary > Groups	176	-.41	Seghers 1981
B	House sparrow: <i>Passer domesticus</i> L.	Human	No effect	18	.33	Barnard 1980
B	Sanderling: <i>Calidris alba</i>	Human	No effect.	57	.26	Roberts & Evans 1993
B	Barred ground dove: <i>Geopelia striata</i>	Human	Concave quadratic relationship	184	.17	Greig-Smith 1981
B	Woodpigeon: <i>Columba palumbus</i>	Goshawk	Large groups > Small groups	48	.34	Kenward 1978
B	Bald eagle: <i>Haliaeetus leucocephalus</i>	Human in canoe	Solitary < Groups: ground	67	.01	Knight & Knight 1984
			Solitary > Groups: perched	177	-.10	
B	Brent geese: <i>Branta bernicla</i>	Human	Large groups > Small groups			Owens 1977
B	Pink-footed goose: <i>Anser brachyrhynchus</i>	Car	Large groups > Small groups	24	.43	Madsen 1985
B	Tufted duck: <i>Aythya fuligula</i>	Boat	Large groups > Small groups	6	.81	Batten 1977
B	Pochard: <i>A. ferina</i>	Boat	Large groups > Small groups			Batten 1977
M	Enclosed Merino sheep: <i>Ovis aries</i>	Human	Solitary > Groups			Hutson 1982
M	Moose: <i>Alces alces</i>	Human	Solitary > Groups			Altmann 1958
M	Thomas' leaf monkey: <i>Prebytis thomasi</i>	Human	No effect	25	.18	van Schaik et al. 1983
M	Long-tailed macaque: <i>Macaca fascicularis</i>	Human	Large groups > Small groups	45	.44	van Schaik et al. 1983
M	Pig-tailed macaque: <i>Macaca nemestrina</i>	Human	Large groups > Small groups	24	.46	van Schaik et al. 1983
M	Lar gibbon: <i>Hylobates lar</i>	Human	No effect	14	.26	van Schaik et al. 1983

Patch Quality/Cost of Leaving
Territory & Mate Defense

F	Cichlid: <i>Nannacara anomala</i>	Model predator fish	♂♂: Mouth-fighting pairs < Tail-beating pairs = single fish	Jakobsson et al. 1995 Brick 1998
R	Lizard: <i>Psammodromus algirus</i>	Human	♂♂: Mate-guarding < Lone	Martin & López 1999
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	♂♂: Mate-guarding < Lone ♂ introduced to: Mate-guarding ♂♂ < Isolated ♂♂ < Control ♂♂ ♀ introduced to: Isolated ♂♂ < Mate-guarding ♂♂	Cooper 1997b Cooper 1999
R	Lizard: <i>Tropidurus hispidus</i>	Human	♂♂: Guarding territory > During encounter with intruder	Díaz-Uriarte 1999
R	Marine iguana: <i>Amblyrhynchus cristatus</i>	Human	♂♂: Territorial < Nonterritorial	Shallenberger 1970
B	Brown pelican: <i>Pelecanus occidentalis</i>	Human, Boat	Foraging > Nesting (both preds)	Rodgers & Smith 1997
B	Anhinga: <i>Anhinga anhinga</i>	Boat	Foraging > Nesting	Rodgers & Smith 1997
B	Double-crested cormorant: <i>Phalacrocorax auritus</i>	Human	No effect: Foraging = Nesting	Rodgers & Smith 1997
B	Great blue heron: <i>Ardea herodias</i>	Human	No effect: Foraging = Nesting	Rodgers & Smith 1997
B	Great egret: <i>Ardea alba</i>	Human Boat	No effect: Foraging = Nesting Foraging > Nesting	Rodgers & Smith 1997
B	Tricolored heron: <i>Egretta tricolor</i>	Human	Foraging < Nesting	Rodgers & Smith 1997
B	Wood stork: <i>Mycteria americana</i>	Boat	Foraging > Nesting	Rodgers & Smith 1997
M	Thomson's gazelle: <i>Gazella thomsoni</i>	Car	♂♂: Territorial < Bachelor < Solitary	Walther 1969
Feeding Site				
I	Crayfish: <i>Procambarus clarkii</i>	Net	Large food items < small food items	Bellman & Krasne 1983
I	Hermit crab: <i>Pagurus acadianus</i>	Model lobster	No effect of food mass	Scarratt & Godin 1992
I	Lotic mayfly: <i>Baetis tricaudatus</i>	Longnose dace Stonefly	Low food reward > High food reward	Scrimgeour & Culp 1994
F	Brook trout: <i>Salvelinus fontinalis</i>	Human	High feed rate < Low feed rate	Grant & Noakes 1987
F	Guppy: <i>Poecilia reticulata</i>	Model pike cichlid	Nonforaging > Foraging	Krause & Godin 1996
R	Bonaire whiptail lizard: <i>Cnemidophorus murinus</i>	Human	Food present < No food present	Cooper et al. 2003
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	Feeding < Not feeding	Cooper 2000a
B	House sparrow: <i>Passer domesticus</i> L.	Human	High seed density > Low seed density	Barnard 1980
M	Moose: <i>Alces alces</i>	Human	Feed in water < Feed on land	Altmann 1958
M	Svalbard reindeer: <i>Rangifer tarandus platyrhynchus</i>	Snowmobile	Feeding < Lying down	Tyler 1991

Distance to Refuge (RD)

I	Fiddler crab: <i>Uca tangeri</i>	Human	♂♂: Long RD > Short RD ♀♀: No effect	5 8	.94 .24	Jordão & Oliveira 2001
F	African cichlid fish: <i>Melanochromis chipokae</i>	Black ball	Long RD > Short RD	18	.72	Dill 1990
F	Killifish: <i>Fundulus diaphanus</i>	Black object	Long RD > Short RD	42	.45	McLean & Godin 1989
F	Threespine stickleback: <i>Gasterosteus aculeatus</i>	Black object	No effect			McLean & Godin 1989
F	Ninespine stickleback: <i>Pungitius pungitius</i>	Black object	No effect			McLean & Godin 1989
R	Iberian rock lizard: <i>Lacerta monticola</i>	Human	Long RD > Short RD	105	.31	Martín & López 2000a
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	Long RD > Short RD	106 84	.55 .42	Martín & López 2003a Cooper 2000b Cooper 2003a
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	Long RD > Short RD While eating: Long RD > Short RD When not feeding: No effect	21	.54	Cooper 1997a Cooper 2000a Cooper 2000a
R	Wall lizard: <i>Podarcis muralis</i>	Human	Long RD > Short RD Long RD > Short RD: site 1 No effect: site 2	156 20 20	.34 .63 .35	Braña 1993 Diego-Rasilla 2003 Diego-Rasilla 2003
R	Zebra-tailed lizard: <i>Callisaurus draconoides</i>	Human	Long RD > Short RD			Bulova 1994
R	Greater earless lizard: <i>Cophosaurus texanus</i>	Human	Long RD > Short RD			Bulova 1994
R	Lizard: <i>Psammodromus algirus</i>	Human	No effect	150	.01	Martín & López 2000b
R	Lizard: <i>Acanthodactylus erythrurus</i>	Human	Long RD > Short RD	18	.64	Martín & López 2003b
M	Woodchuck: <i>Marmota monax</i>	Human	Long RD > Short RD Long RD > Short RD: a* Long RD > Short RD: b	6 31 27	.92 .76 .83	Bonenfant & Kramer 1996 Kramer & Bonenfant 1997 Kramer & Bonenfant 1997
M	Gray squirrel: <i>Sciurus carolinensis</i>	Motorized cat model	Long RD > Short RD	90	.86	Dill & Houtman 1989

Habitat Type / Amount of Cover

F	Brook trout: <i>Salvelinus fontinalis</i>	Human	Low cover > High cover			Grant & Noakes 1987
R	Chameleon: <i>Chamaeleo chamaeleon</i>	Human	Low cover > High cover			Cuadrado et al. 2001
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	Bare ground > Leaf litter			Cooper 1998
R	Lizard: <i>Psammodromus algirus</i>	Human	Low cover > High cover Juveniles: Exposed = Covered			Martín & López 2000b Martín & López 1995a
R	Broad-headed skink: <i>Eumeces laticeps</i>	Human	High in trees < Low in trees			Cooper 1997a
R	Lizard: <i>Psammodromus algirus</i>	Human	With refuge plants > No refuge plants			Martín & López 1995b

R	Lizards: <i>Anolis cybotes</i> , <i>A. distichus</i> , <i>A. coelestinus</i> , <i>A. bahorucoensis</i>	Human	Natural perch: High < Low Fencepost: Low < High No effect of perch diameter	Schneider et al. 2000
R	Northern water snake: <i>Nerodia sipedon</i>	Human	Lower perch < Higher perch	Weatherhead & Robertson 1992
R	Zebra-tailed lizard: <i>Callisaurus draconoides</i>	Human	Site w/ less cover > Other sites	Bulova 1994
R	Desert iguana: <i>Dipsosaurus dorsalis</i>	Human	Open sites > Semi-open > Bushy	Cooper 2003b
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	Open sites > Plant cover (incomplete cover)	Cooper 2003c
R	Striped plateau lizard: <i>Sceloporus virgatus</i>	Human	No effect (woods v. slide)	Smith 1996
R	Spiny chuckwalla: <i>Sauromalus hispidus</i>	Human	Dens > Rocks > Feeding areas	Shallenberger 1970
R	Lava lizards: <i>Tropidurus albemarlensis</i>	Human	Sparse cover > Heavy cover	Snell et al. 1988
B	House sparrow: <i>Passer domesticus</i> L.	Human	In open fields > Inside shed	Barnard 1980
B	Herring gull: <i>Larus argentatus</i>	Human	Open sites > Dense bush cover Less vegetation cover > More cover	Burger & Gochfeld 1981 Burger & Gochfeld 1983
B	Great black-backed gull: <i>Larus marinus</i>	Human	No effect of % vegetation cover	Burger & Gochfeld 1983
B	Bald eagle: <i>Haliaeetus leucocephalus</i>	Human in canoe	Standing/feeding > Perched (p=0.06) Heavy vegetation < Open areas	Knight & Knight 1984 Stalmaster & Newman 1978
B	American kestrel: <i>Falco sparverius</i>	Human	Perch Ht: High < Low	Holmes et al. 1993
B	Prarie falcon: <i>F. mexicanus</i>	Human	Perch Ht: High < Low	Holmes et al. 1993
B	Ferruginous hawk: <i>Buteo regalis</i>	Human	Perch Ht: High < Low	Holmes et al. 1993
B	Merlin: <i>Falco columbarius</i>	Human	Perch Ht: No effect	Holmes et al. 1993
B	Rough-legged hawk: <i>Buteo lagopus</i>	Human	Perch Ht: No effect	Holmes et al. 1993
B	Golden eagle: <i>Aguila chrysaetos</i>	Human	Perch Ht: No effect	Holmes et al. 1993
M	Enclosed Merino sheep: <i>Ovis aries</i>	Human	Enclosed: Narrow lane < Wide lane	Hutson 1982
M	Moose: <i>Alces alces</i>	Human	In open country > In forest/shrubs Moving < Feed in flat < Feed in H ₂ O	Altmann 1958 McMillan 1954
M	Blesbok: <i>Damaliscus dorcas phillipsi</i>	Human	More open terrain > Less open terrain	Rowe-Rowe 1974
M	Svalbard reindeer: <i>Rangifer tarandus platyrhynchus</i>	Snowmobile	Open terrain > Restricted view	Tyler 1991

I = Invertebrate, F = Fish, B = Bird, R = Reptile, M = Mammal, RD = Distance to refuge. If no *N* or *r*-value is given, sufficient data to calculate effect size was not reported and the study was not included in the meta-analysis. No meta-analyses were conducted on “Patch Quality / Cost of Leaving” or “Habitat Type / Amount of Cover.”

*Kramer & Bonenfant 1997: a = burrow in front of animal, b = burrow behind animal

SECTION D: Physiological, morphological, and life history factors influencing flight initiation distance

Taxa	Prey Species	Predator(s)	Effect on Flight Distance	N	r	Source
Degree of Crypsis						
Morphological Aspects						
R	Lizard: <i>Psammodromus algirus</i>	Human	Bright ♂♂ > Dull ♂♂ > ♀♀	84	.42	Martín & López 1999
R	Lizards: <i>Anolis cristatellus</i> & <i>A. stratulus</i>	Human	More cryptic sp. (<i>A. stratulus</i>) < Less cryptic sp. (<i>A. cristatellus</i>)	77	.38	Heatwole 1968
R	Lizard: <i>Sceloporus occidentalis</i>	Human	More cryptic females & juveniles <	169	.34	Johnson 1970
R	Lizard: <i>Sceloporus biseriatus</i>	Human	Less cryptic males	145	.28	
Effect of Time & Light						
R	Black iguana: <i>Ctenosaura similes</i>	Human	No effect (time of day)			Burger & Gochfeld 1990
B	6 raptor spp.	Human, Car	No effect (time, cloud cover)			Holmes et al. 1993
M	Alpine marmot: <i>Marmota marmota</i>	Human, Dog	Late in day < Early in day			Louis & Le Berre 2000
M	Moose: <i>Alces alces</i>	Human	Dusk/dawn < Other times			Altmann 1958
M	Thomson's gazelle: <i>Gazella thomsoni</i>	Human or Car	Morning < Evening			Walther 1969
Effects of Habitat: See Appendix C						
Morphological Defenses						
F	Brook stickleback: <i>Culea inconstans</i>	Yellow perch	Armored sticklebacks < Unarmored minnows	16	.65	Abrahams 1995
F	Fathead minnow: <i>Pimephales promelas</i>					
F	Killifish: <i>Fundulus diaphanous</i>	Black object	Armored threespine < Unarmored killifish	56	.41	McLean & Godin 1989
F	Threespine stickleback: <i>Gasterosteus aculeatus</i>					
F	Ninespine stickleback: <i>Pungitius pungitius</i>		Armored ninespine < Unarmored killifish	66	.19	McLean & Godin 1989
Physical Condition / Ability to Escape						
R	Lizard: <i>Liolaemus nigromaculatus</i>	Human	Large: Intact tails > Autotomized Small: No effect of tail autotomy			Kelt et al. 2002
R	Ground skink: <i>Scincella lateralis</i>	Green plastic lizard	Intact tails > Autotomized			Formanwicz et al. 1990
R	Black iguana: <i>Ctenosaura similes</i>	Human	Intact tails > Autotomized			Burger & Gochfeld 1990
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	No effect of tail autotomy			Cooper 2003a
R	Striped plateau lizard: <i>Sceloporus virgatus</i>	Human	Intact tails > Autotomized			Smith 1996
B	Woodpigeon: <i>Columba palumbus</i>	Goshawk	Poor condition > Good condition			Kenward 1978

Size

I	Fiddler crab: <i>Uca tangeri</i>	Human	No effect	Jordão & Oliveira 2001
I	Lotic mayfly: <i>Baetis tricaudatus</i>	Longnose dace	Large larvae < Small larvae	Scrimgeour et al. 1997
F	Brook stickleback: <i>Culea inconstans</i>	Yellow perch	Long body < Short body	Abrahams 1995
F	Brook trout: <i>Salvelinus fontinalis</i>	Human	Short body < Long body	Grant & Noakes 1987
F	Bicolor damselfish: <i>Pomacentrus partitus</i>	Atlantic trumpetfish	No effect	Helfman & Winkelman 1997
R	Lizard: <i>Liolaemus nigromaculatus</i>	Human	No effect	Kelt et al. 2002
R	Black iguana: <i>Ctenosaura similes</i>	Human	Long > Short snout-vent length	Burger & Gochfeld 1990
R	Queen snake: <i>Regina septemvittata</i>	Human	No effect	Layne & Ford 1984
R	Iberian Rock Lizard: <i>Lacerta monticola</i>	Human	Long > Short snout-vent length	Martín & López 2003a
R	Marine iguana: <i>Amblyrhynchus cristatus</i>	Human	Long > Short snout-vent length	Shallenberger 1970
R	Spiny chuckwalla: <i>Sauromalus hispidus</i>	Human	Dens: Large/med > Small Feeding grounds: No effect	Shallenberger 1970
R	Mojave Desert chuckwalla: <i>Sauromalus obesus</i>	Human	No effect	Shallenberger 1970
R	Piebald chuckwalla: <i>Sauromalus varius</i>	Human	No effect	Shallenberger 1970
R	Striped plateau lizard: <i>Sceloporus virgatus</i>	Human	No effect	Smith 1996
B	17 passerine spp.	Human	Small species < Large species	Cooke 1980
B	6 raptor spp.	Human, Car	Human: Small < Large species Car: No effect	Holmes et al. 1993

Sex

I	Fiddler crab: <i>Uca tangeri</i>	Human	No effect	Jordão & Oliveira 2001
F	Killifish: <i>Fundulus diaphanus</i>	Black object	No effect	McLean & Godin 1989
F	Threespine stickleback: <i>Gasterosteus aculeatus</i>	Black object	No effect	McLean & Godin 1989
F	Ninespine stickleback: <i>Pungitius pungitius</i>	Black object	No effect	McLean & Godin 1989
R	Eastern brownsnake: <i>Pseudonaja textiles</i>	Human	No effect	Whitaker & Shine 1999
R	Lizard: <i>Podarcis muralis</i>	Human	Males > Females	Braña 1993
R	Zebra-tailed lizard: <i>Callisaurus draconoides</i>	Human	Males > Females	Bulova 1994
R	Greater earless lizard: <i>Cophosaurus texanus</i>	Human	Males > Females	Bulova 1994
R	Black iguana: <i>Ctenosaura similes</i>	Human	No effect	Burger & Gochfeld 1990
R	Keeled earless lizard: <i>Holbrookia propinqua</i>	Human	No effect	Cooper 2003a
R	Spiny chuckwalla: <i>Sauromalus hispidus</i>	Human	No effect	Shallenberger 1970
R	Mojave Desert chuckwalla: <i>Sauromalus obesus</i>	Human	No effect	Shallenberger 1970
R	Piebald chuckwalla: <i>Sauromalus varius</i>	Human	No effect	Shallenberger 1970
R	Queen snake: <i>Regina septemvittata</i>	Human	No effect	Layne & Ford 1984
R	Striped plateau lizard: <i>Sceloporus virgatus</i>	Human	No effect	Smith 1996

