Döring et al.:

Behavior of Laboratory Dogs Before and After Rehoming in Private Homes

Supplementary Data

Tab. S1: Behavior tests
Test categories in the order they were performed and description of the tests, definition of the behavior parameters, definition of the scores and test results. Percentage (number) of dogs are given.

Category	Description/Definition	Score	Test 1	Test 2
Isolation	*Dog 90 seconds alone in test arena.*		(n = 140)	(n = 59)
runs around "curiously"	running around and exploring the room with quick strides and without hesitation	3	75% (105)	63% (37)
runs around "cautiously"	running and looking around the room slowly or hesitantly	1	25% (35)	34% (20)
no locomotion	no locomotion during the 90 seconds	0	0% (0)	3% (2)
Contact	*Test person enters and stands motionless for 60 seconds.*		(n = 140)	(n = 68)
friendly contact	dog walks quickly toward the person and licks/sniffs/jumps up	3	64% (90)	56% (38)
cautious contact	dog approaches the person hesitantly and sniffs or licks	2	23% (32)	13% (9)
circles	dog runs in a circle around the person, without touching her	1	3% (4)	1% (1)
fear and avoidance	dog does not approach the person, moves away when the person approaches, and shows signals of fear	0	8% (11)	15% (10)
does something else	dog does not seek contact and shows no change of current behavior	1/2[b]	2% (3)	13% (9)
aggression	dog barks, growls, bares teeth, snaps or bites	0	0% (0)	1% (1)
Luring	*Test person squats down and claps hands, dog is petted when he/she comes to the test person.*		(n = 139)	(n = 68)
comes immediately	dog comes directly to the test person without hesitation	3	58% (81)	51% (35)
comes hesitantly	dog approaches the test person slowly and cautiously	2	27% (37)	31% (21)
does not come	dog does not approach the test person	0	15% (21)	18% (12)
Following	Test person passes the dog and strides once around the test arena, ignoring the dog.		(n = 139)	(n = 65)
follows	dog follows the test person	3	82% (114)	60% (39)
observes	dog observes the test person	2	6% (8)	26% (17)
evades	dog evades the test person's movement	0	5% (7)	0% (0)
does something else	dog does not follow the person and shows no change in behavior	1	2% (3)	5% (3)
fear and avoidance	dog does not follow the person, moves away when the person comes near the dog, shows signals of fear	0	5% (7)	9% (6)

Test 1 was conducted 1 week before leaving the research facility and Test 2 was conducted 6 weeks after placement in the new home.

[b] The score was 1 in Test 1 and 2 in Test 2.

Category	Description/Definition	Score	Test 1	Test 2
Playing	*Test person rolls a rubber ball across the floor.*		(n = 140)	(n = 66)
plays	dog follows the ball and/or picks up the ball with his/her mouth	–	76% (107)	55% (36)
does not play	dog does not engage in the play and does something else	–	24% (33)	45% (30)
Chasing	*Test person pulls a shuttlecock on a string past the dog.*		(n = 140)	(n = 66)
follows	dog chases after the object	–	47% (66)	41% (27)
does not follow	dog does not engage in chasing and does something else	–	53% (74)	59% (39)
Provocation[a]	*Test person grips the muzzle and holds it shut for 10 seconds with one hand, the other hand is placed on the dog's neck.*		(n = 140)	(n = 63)
acceptance	dog tolerates the situation	3	64% (90)	57% (36)
slight withdrawal	dog tries to withdraw (movement of head or body, paw on the examiner's hand)	2	21% (29)	30% (19)
freeing	dog frees him-/herself from the grip	1	10% (14)	8% (5)
moves away	dog moves away from examiner, examiner cannot perform test	0	5% (7)	5% (3)
aggression	dog barks, growls, bares teeth, snaps or bites	0	0% (0)	0% (0)
Unknown object First reaction	*Test person shakes an empty plastic bag open, twists the bag and places the bag on the floor.*		(n = 139)	(n = 68)
is relaxed	dog does not flinch or move back	3	24% (34)	43% (29)
gets startled	dog flinches	1	34% (47)	28% (19)
gets frightened	dog cringes or moves back	0	42% (58)	29% (20)
Unknown object Second reaction			(n = 140)	(n = 68)
makes contact	dog approaches the object and makes contact with his/her snout (sniffs or bites the object)	3	63% (88)	65% (44)
looks at it	dog watches the object but does not touch it	2	14% (19)	16% (11)
does something else	dog shows no reaction	1	6% (8)	3% (2)
fear and avoidance	dog moves back and/or stays at a distance, shows signals of fear	0	17% (25)	16% (11)
Noise First reaction	*Test person rings a bicycle bell, her back facing the dog.*		(n = 135)	(n = 68)
is relaxed	dog does not flinch and does not move back	3	71% (95)	84% (57)
gets startled	dog flinches	1	10% (14)	6% (4)
gets frightened	dog cringes or moves back	0	19% (26)	10% (7)
Noise Second reaction			(n = 135)	(n = 68)
makes contact	dog approaches and watches the bell and/or makes contact with his/her snout	3	58% (78)	75% (51)
does something else	dog shows no reaction	3	28% (38)	13% (9)
fear and avoidance	dog moves back and/or stays at a distance, shows signals of fear	0	14% (19)	12% (8)
Examination[a]	see Tab. S2			
Placing collar and leash	*Test person places a collar and a leash on the dog.*		(n = 139)	(n = 66)
acceptance	dog tolerates the situation	3	84% (117)	91% (60)
slight withdrawal	dog tries to withdraw (movement of head or body, paw on the test person's hand)	2	4% (6)	3% (2)

Test 1 was conducted 1 week before leaving the research facility and Test 2 was conducted 6 weeks after placement in the new home.

[a] Dogs were auscultated (for 15 seconds) after provocation, examination and feeding.

Category	Description/Definition	Score	Test 1	Test 2
moves away	dog moves away from the test person, she cannot place collar	0	12% (16)	6% (4)
aggression	dog shows signals of aggression	0	0% (0)	0% (0)
Leash-behavior	*Test person gets up and walks 2–4 steps with the dog then stops and takes the leash and collar off the dog.*		(n = 125)	(n = 62)
follows along	examiner barely has to pull on the leash to make the dog take a few steps	3	20% (25)	35% (22)
moves after being pulled	dog moves along for a few steps after the examiner pulls on the leash	1	1% (1)	5% (3)
pulls on the leash	dog pulls on the leash	1	1% (1)	0% (0)
does not walk on the leash	even after the examiner pulls on the leash the dog does not walk, dog stops, sits or lies down	0	78% (98)	60% (37)
First cloth test	*Test person slowly spreads a thin cloth over the dog (incl. head).*		(n = 139)	(n = 66)
lets it happen	dog allows being covered without moving away	–	64% (89)	65% (43)
initially moves away	dog moves initially away from the cloth, then allows being covered	–	18% (25)	14% (9)
does not allow being covered	dog avoids being covered by moving away	–	18% (25)	21% (14)
plays with the cloth	dog bites playfully into the cloth and/or shows playful behavior	–	2% (3)	5% (3)
First freeing	*Test person removes the cloth after 15 seconds if the dog does not free him-/herself.*		(n = 113)	(n = 52)
frees him-/herself	dog frees her-/himself from the cloth	–	67% (76)	83% (43)
does not free him-/herself	dog does not try to free him-/herself or dog is unable to free him-/herself	–	33% (37)	17% (9)
Second cloth test	*Test person repeats the covering process.*		(n = 138)	(n = 64)
lets it happen	dog allows being covered without moving away	–	51% (70)	55% (35)
initially moves away	dog moves initially away from the cloth, then allows being covered	–	14% (20)	13% (8)
does not allow being covered	dog avoids being covered by moving away	–	35% (48)	33% (21)
plays with the cloth	dog bites playfully into the cloth and/or shows playful behavior	–	1% (1)	5% (3)
Second freeing	*Test person removes the cloth after 15 seconds if the dog does not free him-/herself.*		(n = 86)	(n = 42)
frees him-/herself	dog frees her-/himself from the cloth	–	77% (66)	88% (37)
does not free him-/herself	dog does not try to free him-/herself or dog is unable to free him-/herself	–	23% (20)	12% (5)
Learning effect			(n = 87)	(n = 42)
exists	dog frees him-/herself not the first but the second time or dog frees him-/herself faster the second time	–	63% (55)	52% (22)
does not exist	dog takes the same time or longer to free him-/herself when being covered the second time or does not free him-/herself both times	–	37% (32)	48% (20)
Feeding[a]	*Test person offers dog (the familiar) food in his/her palm. If the dog does not eat out of hand, the food is put on the floor.*		(n = 139)	(n = 60)
takes food from hand	dog eats food out of hand	–	32% (44)	70% (42)
takes food from the floor	dog eats the food after it is put on the floor	–	32% (45)	8% (5)
does not eat	dog does not eat the food out of the hand or from the floor	–	36% (50)	22% (13)

Test 1 was conducted 1 week before leaving the research facility and Test 2 was conducted 6 weeks after placement in the new home.

[a] Dogs were auscultated (for 15 seconds) after provocation, examination and feeding.

Tab. S2: Behavior tests: Dog behavior during a general examination

Reaction	Score	Test 1				Test 2			
		Ears (n = 138)	Mouth (n = 137)	Legs (n = 138)	Auscultation (n = 139)	Ears (n = 66)	Mouth (n = 65)	Legs (n = 66)	Auscultation (n = 66)
acceptance	3	91% (125)	85% (117)	93% (129)	76% (105)	91% (60)	88% (57)	93% (63)	85% (56)
slight withdrawal	2	7% (10)	6% (8)	4% (5)	15% (21)	0% (0)	3% (2)	1% (1)	6% (4)
freeing	1	0% (0)	1% (2)	1% (1)	4% (5)	0% (0)	0% (0)	0% (0)	2% (1)
moves away	0	2% (3)	7% (10)	2% (3)	6% (8)	9% (6)	9% (6)	3% (2)	8% (5)
aggression	0	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)

Test 1 was performed 1 week before leaving the research facility, Test 2 was conducted 6 weeks after adoption. The examiner squatted down, examined both of the dog's ears, opened his/her mouth, lifted all of the dog's legs one after the other and determined the heart rate with a stethoscope. Definitions of reactions are analogous to "provocation" in Tab. S1.

Tab. S3: Telephone interviews with the new owners 1 week (Interview 1) and 12 weeks (Interview 2) after adoption
Description of the questions asked, definition of the behavior parameters, scores and test results. Percentage (number) of dogs are given.

Category	Description/Definition	Score	Interview 1	Interview 2
Isolation	*Dog is left alone in the home. Behavior of the dog is being observed by the owner and/or a neighbor by listening and watching through a window or glass door.*		(n = 114)	(n = 124)
calm	dog does not bark, howl or whine and does not destroy anything	3	82% (94)	64% (79)
unsettled	dog is unsettled and moves around; dog barks, howls or whines up to 3 min	1	4% (5)	10% (13)
separation problems	dog barks, howls or whines more than 3 min and/or destroys objects in the home	0	13% (15)	26% (32)
Contact with visitor	*A person unknown to the dog enters the home.*		(n = 136)	(n = 124)
friendly contact	dog quickly walks toward the person with a relaxed body posture and licks/sniffs/jumps up	3	32% (44)	46% (57)
cautious contact	dog hesitantly approaches the person with signals of fear, watches person/sniffs/licks	2	29% (39)	19% (23)
fear and avoidance	dog does not approach the person; dog moves away when the person approaches and shows signals of fear	0	27% (37)	12% (15)
does something else	dog does not seek contact and shows no change of current behavior	2	7% (9)	3% (4)
active aggression	dog approaches the person and barks, growls, bares teeth or snaps	0	2% (3)	12% (15)
defensive aggression	dog barks, growls, bares teeth or snaps when being approached by the person	0	3% (4)	8% (10)
Luring	*Reaction of the dog when being lured by the owner.*		(n = 143)	(n = 121)
comes immediately	dog comes directly to owner without hesitation	3	50% (72)	78% (94)
comes hesitantly	dog approaches the owner slowly and cautiously and/or after being called several times	2	35% (50)	19% (23)
does not come	dog does not approach the owner	0	15% (21)	3% (4)
Playing	*Reaction of the dog when owner tries to encourage the dog to play.*		(n = 143)	(n = 126)
plays	dog follows the toy and/or picks up the toy with his/her mouth	–	57% (81)	73% (92)
does not play	dog does not engage in the play and does something else	–	43% (62)	27% (34)

Category	Description/Definition	Score	Interview 1	Interview 2
Chasing	*Reaction of the dog when a potential chasing object is near the dog.*		(n = 143)	(n = 125)
follows	dog chases after the object	–	20% (29)	42% (53)
does not follow	dog does not follow the object and does something else	–	80% (114)	58% (72)
Provocation	see Tab. S4			
Object First reaction	*Reaction of the dog to objects. (Question: Did you notice that your dog shows fear or unease when he/she sees certain objects?)*		(n = 142)	(n = 125)
is relaxed	dog does not flinch or move back	3	14% (20)	24% (30)
gets startled	dog flinches or moves back/shows fear (shorter than 30 seconds)	1	49% (69)	42% (53)
gets frightened	dog flinches or moves back and then shows fear (longer than 30 seconds)	0	37% (53)	34% (42)
Object Second reaction			(n = 139)	(n = 120)
makes contact	dog approaches and watches object and/or makes contact with his/her snout	3	31% (43)	24% (29)
is relaxed	dog shows no reaction	3	30% (42)	37% (44)
fear and avoidance	dog moves back and/or stays at a distance, shows signals of fear	0	39% (54)	39% (47)
Noise First reaction	*Reaction of the dog to noises. (Question: Did you notice that your dog shows fear or unease when he/she hears certain noises?)*		(n = 141)	(n = 125)
is relaxed	dog does not flinch or move back	3	21% (29)	47% (59)
gets startled	dog flinches or moves back/shows signals of fear (shorter than 30 seconds)	1	43% (61)	32% (40)
gets frightened	dog flinches or moves back and then shows signals of fear (longer than 30 seconds)	0	36% (51)	21% (26)
Noise Second reaction			(n = 136)	(n = 124)
makes contact	dog approaches and watches source of noise and/or makes contact with his/her snout	3	14% (19)	10% (12)
is relaxed	dog shows no reaction	3	54% (73)	70% (87)
fear and avoidance	dog moves back and/or stays at a distance; shows signals of fear	0	32% (44)	20% (25)
Examination by the owner	*Behavior when being fixated and examined by the owner.*		(n = 142)	(n = 126)
acceptance	dog tolerates the situation	3	96% (136)	99% (125)
slight withdrawal	dog tries to withdraw (movement of head or body, paw on the owner's hand)	2	2% (3)	0% (0)
freeing	dog frees him-/herself from the owner's fixation	1	0% (0)	0% (0)
moves away	dog moves away from owner, owner cannot perform examination	0	2% (3)	1% (1)
aggression	dog barks, growls, bares teeth or snaps	0	0% (0)	0% (0)
Placing collar and leash	*Behavior when owner places collar/harness and leash on dog.*		(n = 142)	(n = 125)
acceptance	dog tolerates the situation	3	82% (117)	90% (112)
slight withdrawal	dog tries to withdraw (movement of head or body, paw on the owner's hand)	2	6% (9)	5% (6)
moves away	dog moves away from owner, owner cannot place collar	0	8% (12)	5% (6)
aggression	dog barks, growls, bares teeth or snaps	0	3% (4)	1% (1)

Category	Description/Definition	Score	Interview 1	Interview 2
Leash-behavior	*Behavior of dog while being walked outdoors on a leash.*		(n = 139)	(n = 124)
follows along	dog follows along without the dog or the owner pulling on the leash	3	42% (58)	75% (93)
moves after being pulled	dog only moves along when the owner pulls on the leash	1	19% (27)	4% (5)
pulls on the leash	dog pulls on the leash	1	26% (36)	15% (19)
does not walk on the leash	even after owner pulls on the leash the dog does not walk, dog stops, sits or lies down	0	13% (18)	6% (7)
Feeding out of hand	*Behavior of dog when being offered food.*		(n = 139)	(n = 126)
eats out of hand	dog eats the food being offered out of the owner's hand	_	88% (123)	95% (120)
does not eat out of hand	does not eat the food offered out of the owner's hand	_	12% (16)	5% (6)
Other dogs	*Behavior of dog when meeting other dogs while on a walk or when other dogs visit the dog owner's home.*		(n = 132)	(n = 124)
friendly contact	dog wags his/her tail, has relaxed body posture, plays with the other dog	3	52% (69)	59% (73)
cautious contact	dog hesitantly approaches the other dog with signals of fear	2	17% (22)	17% (21)
fear and avoidance	dog does not approach the other dog, dog moves away when the other dog approaches and shows signals of fear	0	12% (16)	10% (12)
no contact/neutral	dog does not seek contact and shows no change of current behavior	2	8% (10)	3% (4)
trying to impress	head held high, legs extended, tail pointing up	1	2% (2)	2% (3)
active aggression	dog approaches the other dog and barks, growls, bares teeth or snaps	0	6% (8)	6% (7)
defensive aggression	dog barks, growls, bares teeth or snaps when being approached by the other dog	0	4% (5)	3% (4)

Tab. S4: Telephone interviews: Behavior reactions during several manipulations by the new owner

Provocation	Leaning over dog	Carrying	Pushing	Taking away food	Taking object out of mouth	Gripping muzzle
Interview 1	(n = 137)	(n = 142)	(n = 128)	(n = 109)	(n = 95)	(n = 46)
acceptance	91% (124)	98% (139)	98% (126)	95% (104)	96% (91)	93% (43)
slight withdrawal	4% (5)	1% (1)	1% (1)	1% (1)	1% (1)	4% (2)
freeing	0% (0)	0% (0)	1% (1)	0% (0)	0% (0)	0% (0)
moves away	6% (8)	1% (2)	0% (0)	0% (0)	0% (0)	2% (1)
aggression	0% (0)	0% (0)	0% (0)	4% (4)	3% (3)	0% (0)
Interview 2	(n = 126)	(n = 124)	(n = 124)	(n = 124)	(n = 118)	(n = 34)
acceptance	97% (122)	98% (122)	99% (123)	93% (115)	89% (105)	94% (32)
slight withdrawal	2% (2)	1% (1)	0% (0)	1% (1)	1% (1)	6% (2)
freeing	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
moves away	2% (2)	0% (0)	0% (0)	0% (0)	0% (0)	0% (0)
aggression	0% (0)	1% (1)	1% (1)	6% (8)	10% (12)	0% (0)

Definition of reactions analogous to "examination" in Tab. S3.

Tab. S5: Activity of the dogs
Results of the behavior tests before (Test 1) and 6 weeks after adoption (Test 2) and behavior according to the Interviews
1 week (Interview 1) and 12 weeks (Interview 2) after adoption.

Variable	Description	Test 1	Test 2
Activity	*Passing of squares in the test arena during the whole test (video evaluation with grid on screen)*	n = 138	n = 58
High	One-third of the dogs that passed the most squares (Test 1: > 69 squares, Test 2: > 38 squares)	33% (46)	34% (20)
Moderate	One-third of the dogs that passed an intermediate number of squares (Test 1: 47-69 squares, Test 2: 28-38 squares)	33% (46)	33% (19)
Low	One-third of the dogs that passed the fewest squares (Test 1: ≤ 46 squares, Test 2: ≤ 27 squares)	34% (47)	33% (19)
		Interview 1	Interview 2
Activity level at home		n = 138	n = 123
High	Dog responds to almost every small change in the environment by getting up, moving back and forth; dog does not have long resting periods	26% (36)	12% (15)
Moderate	Dog is involved in the events happening around him/her; dog has long resting periods as well as long activity periods	45% (62)	62% (76)
Low	Dog usually sits or lies on his/her bed; dog does not have long activity periods	29% (40)	26% (32)
Activity level while on a walk		n = 138	n = 120
High	Dog pulls on the leash and/or runs extensively with no signs of exhaustion	27% (37)	34% (41)
Moderate	Dog runs or walks at the same speed as the owner	46% (64)	51% (61)
Low	Dog stops frequently and shows signs of exhaustion	27% (37)	15% (18)
Activity level at night		n = 139	n = 124
High	Owner hears the dog move around several times at night	1% (2)	1% (1)
Moderate	Owner hears the dog move around once at night	8% (11)	4% (5)
Low	Dog stays on his/her bed all night	91% (126)	95% (118)
Activity level of dog during resting periods of owner	*Dog behavior while owner is watching TV, reading a newspaper, etc.*	n = 140	n = 124
High	Dog moves around and makes contact with the owner several times	1% (1)	3% (4)
Moderate	Dog predominantly rests (may change sleeping areas or drink)	2% (3)	2% (2)
Low	Dog rests during the whole period	97% (136)	95% (118)

Tab. S6: Vocalization by the dogs
Results of the behavior tests before (Test 1) and 6 weeks after adoption (Test 2) and behavior according
to the Interviews 1 week (Interview 1) and 12 weeks (Interview 2) after adoption.

Variable	Description	Test 1	Test 2
Vocalization during isolation	*The dog's vocalization during the test section isolation*	n = 140	n = 61
None	No vocalization	46% (64)	64% (39)
Rarely	≤ 10 short (≤ 30 seconds) vocalizations	34% (48)	28% (17)
Frequently	> 10 short or long (> 30 seconds) vocalizations	20% (28)	8% (5)
		Interview 1	**Interview 2**
Barking		n = 143	n = 126
None	No vocalization	45% (65)	16% (20)
Rarely	1-3 short vocalizations (≤ 30 seconds) per week	37% (53)	33% (42)
Occasionally	≤ 3 short vocalizations (≤ 30 seconds) per day	8% (12)	24% (30)
Frequently	> 3 short and/or long (> 30 seconds) vocalizations per day	9% (13)	27% (34)
Howling		n = 142	n = 126
None	No vocalization	79% (112)	60% (76)
Rarely	1-3 short vocalizations (≤ 30 seconds) per week	13% (18)	17% (21)
Occasionally	≤ 3 short vocalizations (≤ 30 seconds) per day	3% (4)	10% (13)
Frequently	> 3 short and/or long (> 30 seconds) vocalizations per day	6% (8)	13% (16)
Whining		n = 142	n = 125
None	No vocalization	72% (102)	74% (93)
Rarely	1-3 short vocalizations (≤ 30 seconds) per week	17% (24)	9% (11)
Occasionally	≤ 3 short vocalizations (≤ 30 seconds) per day	10% (14)	13% (16)
Frequently	> 3 short and/or long (> 30 seconds) vocalizations per day	1% (2)	4% (5)

Tab. S7: Correlations in dogs ≥ 2 years of age
Correlation of behavior scores between behavior tests (Test 1 and Test 2, conducted before and 6 weeks after adoption, respectively) and phone interviews (Int 1 and Int 2, conducted 1 and 12 weeks after adoption, respectively) and of body language scores between both behavior tests (Spearman's rank correlations).

Test situation		Behavior score						Body language score
		Test 1 Test 2	Test 1 Int 1	Test 1 Int 2	Test 2 Int 1	Test 2 Int 2	Int 1 Int 2	Test 1 Test 2
Isolation	n	40	57	60	32	41	51	40
	r	0.2039	0.0397	-0.1903	-0.1755	0.0304	0.2489	0.5162
Contact	n	40	65	60	41	43	66	40
	r	0.3033	0.4716	0.3042	0.1317	0.4574	0.4703	0.1833
Luring	n	39	68	58	43	42	67	39
	r	0.3937	0.1390	0.2192	0.0461	0.2691	0.1326	0.0785
Following	n	39	–	–	–	–	–	39
	r	0.3323	–	–	–	–	–	0.0510
Playing [a]	n	36	69	61	39	37	69	36
	r	0.1244	0.1179	0.0662	0.1257	0.2271	0.5602	0.0680
Chasing [a]	n	36	69	60	38	36	68	36
	r	0.4179	-0.0645	-0.0396	0.0139	-0.0836	0.3274	0.2129
Provocation [b]	n	38	69	61	41	41	69	39
	r	0.1437	-0.1337	-0.1060	0.1299	-0.1758	0.1536	0.1435
Object, first reaction	n	40	69	61	43	43	69	38
	r	0.1449	0.0752	0.0724	-0.0625	0.3219	0.2039	0.1980
Object, second reaction	n	41	68	59	44	41	66	41
	r	0.2609	0.2229	0.3054	0.1331	0.2624	0.2556	0.0961
Noise, first reaction	n	39	67	59	44	43	69	40
	r	0.3509	0.0696	-0.1023	0.2303	0.3200	0.1153	-0.1303
Noise, second reaction	n	39	64	58	43	43	65	–
	r	0.4411	0.0574	-0.2304	0.2419	0.0478	0.1695	–
Examination [c]	n	41	68	61	44	43	69	41
	r	-0.0383	-0.0534	0.0000	0.2983	0.2858	0.0000	0.1805
Placing collar	n	41	69	61	44	43	69	41
	r	0.2385	-0.1020	-0.1073	-0.1372	-0.0888	0.1381	-0.0985
Leash behavior	n	39	65	58	43	43	67	39
	r	-0.0303	-0.0511	-0.0969	0.2227	0.1202	0.1023	-0.0386
Feeding [a]	n	34	68	61	36	36	68	34
	r	0.4321	-0.1306	0.1111	0.2988	0.1621	0.1818	0.2308
Activity [a, d]	n	35	68	61	37	34	68	–
	r	0.2013	0.0053	-0.2178	0.2173	-0.3720	0.1502	–
Vocalization [a, e]	n	36	68	59	36	36	67	–
	r	0.0440	0.4564	-0.1131	0.3208	0.3246	0.0492	–
Other dogs	n	–	–	–	–	–	65	–
	r	–	–	–	–	–	0.1582	–

[a] Behavior was not scored, but presence/absence of behavior was determined (e.g., playing: Does dog play in Test 1 and Test 2, yes or no?).
[b] For Interviews 1 and 2, mean values were calculated from 3 manipulations: leaning over dog, carrying dog and pushing dog.
[c] For Tests 1 and 2, mean values were calculated from 4 examinations: ears, mouth, legs and auscultation. [d] For activity levels see Tab. S5.
[e] For Interviews 1 and 2, mean values were calculated from 3 vocalizations: barking, howling and whining.

Colors: White: no correlation (< 0.2); Light gray: low correlation (0.2 to < 0.4); Dark gray: moderate correlation (0.4 to < 0.7); High correlation (≥ 0.7) did not occur

Tab. S8: Correlation of specially selected variables that had previously been suggested to be related Spearman's rank correlation

Variable 1	Variable 2	n	r
Housebroken Interview 1	Age of dog at adoption	143	0.1945
Housebroken Interview 2	Age of dog at adoption	126	0.2578
Behavior during isolation, Interview 1	Age of dog at adoption	114	0.2778
Behavior during isolation, Interview 2	Age of dog at adoption	124	0.2068
Mean heart rate in Test 1*	Personality score in Test 1	125	0.3158
Mean heart rate in Test 1*	Body language score in Test 1	124	0.1995
Mean heart rate in Test 2*	Personality score in Test 2	62	0.0056
Mean heart rate in Test 2*	Body language score in Test 2	61	-0.0097
Vocalization in the test section isolation, Test 1	Behavior during isolation, Interview 1	112	-0.0599
Vocalization in the test section isolation, Test 1	Behavior during isolation, Interview 2	119	-0.1926

* Mean of 3 measurements (auscultations) of heart rate

Colors: White: no correlation (<0.2); Light gray: low correlation (0.2 to <0.4)

Tab. S9: Behavior scores of the dogs: mean, SEM, median, minimum and maximum
Classification of dogs according to the variables of the explorative models (see Tab. 5).

Variable	Test 1						Test 2						Interview 1						Interview 2					
	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max
Age																								
< 0.5 years	27	2.40	0.09	2.50	0.92	3.00	7	2.49	0.24	2.73	1.08	2.92	26	2.25	0.07	2.19	1.58	2.92	13	2.50	0.12	2.64	1.50	2.83
0.5-2 years	42	2.04	0.08	2.17	0.83	2.92	16	2.03	0.16	2.22	0.83	2.75	37	1.96	0.06	1.91	1.05	2.75	29	2.34	0.09	2.45	1.18	3.00
> 2 years	71	2.23	0.05	2.25	1.08	2.83	49	2.02	0.11	2.18	0.00	3.00	80	1.99	0.05	2.09	1.00	2.92	84	2.18	0.05	2.13	1.17	3.00
Sex																								
Male	63	2.19	0.06	2.25	0.83	2.86	35	1.94	0.13	2.02	0.00	2.92	64	2.03	0.05	2.09	1.00	2.75	59	2.24	0.06	2.25	1.42	3.00
Female	77	2.22	0.06	2.25	0.83	3.00	38	2.18	0.12	2.48	0.00	3.00	79	2.03	0.05	2.08	1.05	2.92	67	2.26	0.06	2.33	1.17	3.00
Breeder																								
Breeder Italy	9	2.37	0.15	2.58	1.33	2.83	4	2.36	0.20	2.44	1.83	2.75	9	2.50	0.08	2.42	2.25	2.92	6	2.46	0.21	2.60	1.67	3.00
Breeder USA	34	2.37	0.05	2.46	1.58	2.83	21	2.31	0.14	2.50	0.00	3.00	35	2.02	0.06	2.09	1.27	2.50	32	2.26	0.07	2.33	1.45	2.83
Breeder Germany 1	54	2.07	0.07	2.19	0.83	2.92	35	1.82	0.13	2.00	0.00	3.00	55	1.89	0.06	1.82	1.00	2.70	48	2.13	0.06	2.17	1.17	2.83
Breeder Germany 2	13	1.84	0.13	1.83	1.09	2.58	4	1.67	0.22	1.79	1.08	2.00	14	1.84	0.14	1.82	1.00	2.58	13	1.94	0.10	1.92	1.42	2.83
Breeder	110	2.16	0.05	2.25	0.83	2.92	64	2.01	0.09	2.17	0.00	3.00	113	1.97	0.04	2.00	1.00	2.92	99	2.17	0.04	2.17	1.17	3.00
Inhouse	30	2.38	0.08	2.49	0.92	3.00	9	2.51	0.18	2.60	1.08	2.92	30	2.26	0.06	2.23	1.58	2.92	27	2.55	0.08	2.67	1.50	3.00
Housing in the laboratory																								
Single	107	2.17	0.05	2.48	0.83	2.92	64	2.01	0.09	2.17	0.00	3.00	110	1.96	0.04	1.95	1.00	2.92	96	2.17	0.04	2.17	1.17	3.00
Group	33	2.33	0.09	2.48	0.92	3.00	9	2.51	0.18	2.60	1.08	2.92	33	2.29	0.05	2.27	1.58	2.92	30	2.51	0.07	2.64	1.50	3.00
Stay in shelter																								
< 1 week	21	2.36	0.07	2.48	1.61	2.83	7	2.14	0.19	2.00	1.52	2.92	21	2.02	0.09	2.08	1.00	2.75	17	2.30	0.12	2.42	1.17	2.83
1-2 weeks	14	2.34	0.11	2.29	1.42	2.92	9	2.40	0.16	2.60	1.50	2.83	13	2.06	0.12	2.00	1.42	2.75	13	2.18	0.13	2.33	1.25	2.75
2-4 weeks	11	2.29	0.14	2.42	1.33	2.86	9	2.04	0.23	2.31	0.83	2.75	13	2.14	0.13	2.27	1.36	2.67	12	2.44	0.13	2.56	1.50	2.83
4-8 weeks	15	2.38	0.11	2.50	1.50	3.00	13	2.03	0.26	2.42	0.00	2.75	14	2.07	0.12	2.09	1.05	2.92	14	2.34	0.12	2.46	1.55	3.00
< 8 weeks	24	2.22	0.10	2.31	0.83	2.83	18	1.97	0.20	2.17	0.00	2.83	27	1.82	0.09	1.75	1.00	2.8	23	2.19	0.09	2.08	1.42	3.00
None	55	2.05	0.07	2.17	0.83	2.92	17	2.01	0.16	2.02	1.00	3.00	55	2.10	0.05	2.25	1.20	2.92	47	2.21	0.06	2.17	1.18	2.83
≤ 4 weeks	46	2.34	0.06	2.44	1.33	2.92	25	2.20	0.11	2.42	0.83	2.92	47	2.06	0.06	2.08	1.00	2.75	42	2.30	0.07	2.42	1.17	2.83

Variable	Test 1						Test 2						Interview 1						Interview 2					
	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max
> 4 weeks	39	2.28	0.08	2.42	0.83	3.00	31	2.00	0.16	2.19	0.00	3.00	41	1.91	0.08	1.82	1.00	2.92	37	2.25	0.07	2.09	1.42	3.00
Rehoming organization																								
Labor-beaglehilfe	72	2.11	0.06	2.17	0.83	2.92	21	1.99	0.13	2.00	1.00	3.00	72	2.08	0.05	2.09	1.00	2.92	61	2.18	0.06	2.17	1.17	2.83
Shelter	68	2.31	0.05	2.42	0.83	3.00	52	2.10	0.11	2.42	0.00	3.00	71	1.99	0.06	2.00	1.00	2.92	65	2.32	0.05	2.42	1.25	3.00
Residential area																								
Suburb	63	2.26	0.05	2.38	1.08	2.92	42	2.06	0.12	2.25	0.00	3.00	66	1.92	0.06	1.91	1.00	2.92	58	2.28	0.05	2.42	1.42	2.83
City	13	2.02	0.16	1.75	1.17	2.83	10	2.02	0.22	2.14	1.00	2.83	14	1.99	0.12	2.18	1.20	2.50	9	2.21	0.15	2.25	1.25	2.75
Urban	76	2.22	0.05	2.25	1.08	2.92	52	2.05	0.11	2.25	0.00	3.00	80	1.94	0.05	1.95	1.00	2.92	67	2.27	0.05	2.42	1.25	2.83
Rural	63	2.19	0.06	2.25	0.83	3.00	20	2.08	0.15	2.29	0.00	2.75	63	2.16	0.05	2.25	1.42	2.92	58	2.23	0.07	2.21	1.17	3.00
Family members																								
≤ 2 persons. no child	45	2.19	0.08	2.33	0.83	2.91	18	2.13	0.20	2.42	0.00	3.00	46	2.06	0.06	2.13	1.05	2.92	36	2.13	0.07	2.04	1.17	3.00
> 2 persons. no child	19	2.08	0.11	2.17	0.92	2.67	13	1.68	0.24	1.82	0.00	2.75	20	1.95	0.11	1.91	1.00	2.86	18	2.09	0.13	1.96	1.25	2.75
No child	64	2.16	0.07	2.25	0.83	2.91	31	1.94	0.16	2.17	0.00	3.00	66	2.03	0.06	2.09	1.00	2.92	54	2.12	0.06	2.00	1.17	3.00
≥ 1 child	63	2.26	0.06	2.33	0.83	3.00	33	2.20	0.11	2.45	0.83	3.00	64	2.04	0.05	2.08	1.00	2.92	60	2.35	0.05	2.42	1.18	3.00
Garden																								
No	14	2.07	0.16	2.12	1.17	3.00	10	1.82	0.30	2.08	0.00	2.75	14	2.07	0.13	2.14	1.00	2.75	11	2.34	0.14	2.55	1.42	3.00
Yes	79	2.21	0.05	2.25	0.92	2.91	52	2.06	0.10	2.17	0.00	2.91	83	1.99	0.05	2.00	1.00	2.92	72	2.23	0.05	2.21	1.25	3.00
Partner dog																								
No (I1)	59	2.09	0.08	2.17	0.83	2.92	25	1.88	0.17	2.00	0.00	3.00	61	2.08	0.06	2.17	1.00	2.92	50	2.23	0.06	2.29	1.18	3.00
Yes (I1)	81	2.30	0.04	2.33	1.42	3.00	48	2.17	0.10	2.40	0.00	3.00	82	2.00	0.04	2.00	1.00	2.92	76	2.27	0.05	2.38	1.17	3.00
No (I2)	43	2.08	0.09	2.17	0.83	2.92	22	1.83	0.18	1.92	0.00	2.83	44	2.10	0.07	2.21	1.00	2.92	45	2.31	0.07	2.42	1.18	3.00
Yes (I2)	97	2.26	0.04	2.33	0.83	3.00	51	2.17	0.09	2.42	0.00	3.00	99	2.00	0.04	2.00	1.00	2.92	81	2.22	0.05	2.25	1.17	3.00
Experience																								
First dog	22	2.35	0.07	2.42	1.58	2.81	16	2.22	0.14	2.40	0.92	2.92	23	1.92	0.08	1.83	1.00	2.92	20	2.39	0.10	2.52	1.25	2.83
Other dogs before	115	2.19	0.05	2.25	0.83	3.00	54	2.04	0.11	2.24	0.00	3.00	119	2.05	0.04	2.09	1.00	2.92	103	2.22	0.04	2.25	1.17	3.00

Variable	Test 1						Test 2						Interview 1						Interview 2					
	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max	n	Mean	SEM	Median	Min	Max
Dog classes																								
No (I1)	109	2.17	0.05	2.25	0.83	2.92	59	2.00	0.10	2.17	0.00	3.00	112	1.99	0.04	2.00	1.00	2.92	98	2.19	0.05	2.17	1.17	3.00
Yes (I1)	28	2.35	0.07	2.25	1.33	3.00	12	2.41	0.15	2.67	1.08	2.83	30	2.19	0.06	2.18	1.42	2.92	25	2.50	0.08	2.58	1.50	3.00
No (I2)	88	2.13	0.05	2.19	0.83	2.92	48	2.03	0.11	2.25	0.00	3.00	90	2.01	0.05	2.08	1.00	2.92	92	2.21	0.05	2.25	1.17	3.00
Yes (I2)	32	2.36	0.06	2.40	1.08	3.00	16	2.03	0.18	2.17	0.83	2.83	33	2.11	0.07	2.09	1.27	2.92	33	2.37	0.07	2.45	1.50	3.00
Obedience training																								
No (I1)	47	2.16	0.08	2.25	0.83	3.00	28	1.98	0.17	2.28	0.00	3.00	49	1.92	0.07	1.82	1.00	2.92	41	2.32	0.06	2.25	1.42	3.00
Yes (I1)	91	2.23	0.05	2.25	0.83	2.92	43	2.13	0.09	2.31	0.00	3.00	94	2.09	0.04	2.09	1.00	2.86	83	2.22	0.05	2.33	1.17	3.00
No (I2)	21	2.10	0.13	2.25	0.83	2.81	10	1.38	0.38	1.83	0.00	2.75	23	1.88	0.09	2.00	1.00	2.5	23	2.04	0.11	2.00	1.17	2.83
Yes (I2)	98	2.22	0.04	2.25	0.92	3.00	54	2.15	0.08	2.35	0.83	3.00	99	2.07	0.04	2.09	1.00	2.92	101	2.30	0.04	2.42	1.25	3.00
Punishment																								
Frequently (I1)	76	2.26	0.05	2.26	0.83	3.00	36	2.17	0.10	2.26	0.00	2.92	78	2.09	0.04	2.09	1.00	2.92	68	2.30	0.06	2.42	1.18	3.00
Rarely (I1)	57	2.16	0.07	2.25	0.83	2.92	32	1.98	0.16	2.34	0.00	3.00	59	1.97	0.06	2.00	1.00	2.92	52	2.20	0.06	2.13	1.17	2.83
Frequently (I2)	55	2.28	0.04	2.25	1.40	3.00	27	2.04	0.14	2.17	0.00	3.00	56	1.98	0.06	2.00	1.00	2.92	57	2.30	0.06	2.50	1.17	3.00
Rarely (I2)	64	2.13	0.07	2.25	0.83	2.92	36	2.08	0.12	2.42	0.00	2.92	66	2.10	0.05	2.17	1.00	2.92	67	2.23	0.05	2.17	1.18	3.00
Rewarding																								
Frequently (I1)	97	2.19	0.05	2.25	0.83	2.92	54	2.10	0.10	2.32	0.00	3.00	102	2.03	0.04	2.08	1.00	2.92	88	2.22	0.05	2.25	1.17	3.00
Rarely (I1)	40	2.27	0.07	2.25	0.92	3.00	16	2.05	0.20	2.27	0.00	2.92	40	2.02	0.07	2.04	1.00	2.92	35	2.32	0.08	2.42	1.5	3.00
Frequently (I2)	77	2.15	0.06	2.25	0.83	2.86	40	2.19	0.10	2.42	0.08	3.00	81	2.08	0.05	2.08	1.00	2.92	82	2.29	0.05	2.42	1.17	3.00
Rarely (I2)	43	2.27	0.06	2.25	1.40	3.00	24	1.77	0.18	1.96	0.00	2.92	42	1.96	0.07	2.00	1.00	2.75	43	2.18	0.08	2.17	1.42	3.00

Breeder: all categories of commercial breeders were combined to "breeder"

Housing in the laboratory: pair and group housing were combined to the category "group"

Residential area: the categories "city" and "suburb" were combined to "urban"

Family members: The categories without children were combined to "no child"; families with grandchildren were excluded

Punishment: to build these binary categories, the categories „medium" and „frequently" out of Tab. 1 were combined to "frequently". The categories „none" and „raley" were combined to „rarely"

Rewarding: to build these binary categories, the categories „medium" and „frequently" out of Tab. 1 were combined to "frequently"

$I1$ = using the variables of Interview 1; $I2$ = using the variables of Interview 2; since there were different numbers of owners in Interview 1 and 2 regarding the attendance of dog classes, applying obedience training and frequency of rewarding or punishment, the explorative model was calculated twice.