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Supplementary Material

A. Assistance Dog Test Battery

This section further discusses the novel ADTB ethogram and the studies from which the subtest protocol was adapted. It describes the main similarities and differences between them while highlighting the novelty of the ADTB.

Part I allowed the subject dog to familiarise itself with the new environment on their own terms as they were off-leash. This is similar to the "arena test" in Wilsson and Sundgren (1998), except that no objects were in the arena other than the permanent furniture of the room. Subsequently, in subtest 2 "walking", the dog explored the environment on a lead, guided by the handler, as they walked around the test arena. This is similar to the following subtests in three reported studies: (1) the "leash" subtest in Wilsson and Sinn (2012) performed by prospective military dogs, except that changes in direction were not as frequent; (2) the "walking on leash" subtest in Lucidi et al. (2005), performed by shelter dogs to evaluate their suitability for service work; and (3) the "on leash behaviour" subtest in Weiss and Greenberg (1997).

Part II comprised subtests 2 to 5 which were designed to gather inertial data for the posture recognition system presented in Marcato et al. (2023). Additionally, the behavioural response displayed by the dog in these subtests was also analysed to assess obedience and trainability. Subject dogs were commanded to stand in subtest 3 for inertial data collection purposes, as this is not a command that assistance dogs are normally trained on. Subtests 4 and 5 are similar to the "obedience" subtest in Harvey et al. (2016), except that the handler was the dog's trainer instead of their puppy raiser or a stranger, and "obedience training" in Weiss and Greenberg (1997); Weiss (2002).

Part III was designed to assess the dog's level of body sensitivity. Subtests 6 and 7 were inspired by the work published by Harvey et al. (2016). In order to further investigate the relationship between body sensitivity and training outcome in 5 and 8 months old prospective guide dogs, Harvey et al. (2016) carried out three body sensitivity subtests; namely, "body check", "head ring", and "tea towel". "Head ring" was not associated with training outcome; hence, it was not included in this research. Ethogram scores associated with the "body check" subtest were not significant in Harvey et al. (2016), however, Bray et al. (2019) demonstrated promising results using different ethogram measures. Therefore, it was included as subtest 6 "body check" in this research. Finally, as ethogram measures associated with the tea towel achieved promising results, it was replicated in the exactly same fashion in subtest 7 "tea towel".

Part IV evaluates the dog's ability to focus, which can be considered the opposite of distractibility. Arata et al. (2010) demonstrated an association between distraction and guide dog qualification and suggested that behavioural tests incorporate subtests to objectively evaluate distraction earlier than 3 months into the training programme. Harvey et al. (2016) proposed placing different distracting stimuli along a route through which the subject dog was led on a leash by the handler, in the following order: "food" (paper plates with sausages), "robin" (remote-controlled toy), "pigeons" (plastic pigeon toy) and "human distraction" (researcher stood still and looked at the dog). If the dog stopped walking or tried engaging with any of the stimuli, the handlers would walk them back to the start of the circuit until they moved on. Accordingly, subtest 8 "distractions" was designed to assess the dog's ability to focus on walking in the face of different distracting stimuli (food, people, inanimate and animate objects). This process was repeated twice to enable the evaluation of the change in reaction. It was adapted from Harvey et al. (2016) in order to simplify the materials used and shorten the duration of the test for practical use. The former was achieved by using a bowl of dog food instead of sausages, a standard remote-controlled toy car instead of a robin, and a teddy bear instead of pigeons. The latter was addressed by instructing the handler to walk the subject dog from the start point around this circuit twice, continuing on the route instead of going back to the start. The handler used commands such as "come on" or "leave it" followed by the dog's name whenever they got distracted but continued the route instead of returning to the start point.

Subtest 9 "Kong" was adapted from the subtests "Kong test" in Batt et al. (2008) and Tomkins et al. (2012), "first-stepping" in Tomkins et al. (2012) and "laterality", as they found a significant relationship between guide dog training success and measures of laterality. The Kong toy used in this subtest was filled with a mixture of highly palatable foods prior to freezing it. The calculation of the laterality index as outlined Tomkins et al. (2010) requires 50 valid data points between left or right paw uses. However, for practical use, it can be time-consuming and difficult to determine when 50 data points are completed. Moreover, another significant challenge is to capture valid data points in the video footage, due to the dog's body obscuring the camera view or the dog not being in the shoot, as reported in Batt et al. (2008). Hence, this research investigated a more practical version of this subtest for the first time.

Subtest 10 "dog distraction" is similar to the "dog distraction test" in Batt et al. (2008) and Tomkins et al. (2011), as well as the "unfamiliar dog test" in Bray et al. (2019). The occurrence of jumping and pulling in Batt et al. (2008), the occurrence of painting and the number of licks in Tomkins et al. (2011) during the dog distraction test were significantly associated with a lower probability of graduation in trainee guide dogs. Bray et al. (2019) discovered a significant relationship between scores in the recall, initial reaction, tail position and barks or growls in the unfamiliar dog subtests, and working outcomes in assistance dogs, at different points of the training programme.

Part V assesses emotional regulation by analysing behavioural reactions in response to stimuli and situations which can potentially induce change in emotional state or stress (Katayama et al., 2016; Asher et al., 2013; Maros et al., 2008). Subtest 11 "crate" was modified from the "passive situation" in Svartberg (2002) and "passive test" in Batt et al. (2008) and Tomkins et al. (2011). The test also involved the handler sitting on a chair and ignoring the dog; however, two main adjustments were made. Firstly, the dog was placed in a crate about 3 metres from the handler instead of being leashed. Secondly, the test duration was shortened to 1 minute; unlike in Svartberg (2002) where the test duration was limited to 3 minutes or Batt et al. (2008), and Tomkins et al. (2011) where the test ended either when the dog rested or after 6 minutes. These significant differences in the subtest protocol and ethogram measures originated a novel subtest.

Subtest 12 "petting" was adapted from the "stroking" stimulus proposed in Asher et al. (2013). This subtest aimed at observing the engagement between dog and handler in a somewhat spontaneous way. Asher et al. (2013) found that trainee dogs who scored lower in response to the assessor were significantly less likely to graduate as guide dogs. In this study, this subtest incorporated elements of both petting and physical play, as handlers were allowed to interact with the dogs in their own way providing a more natural demonstration of the handler-dog bond.

Subtest 13 "isolation" was similar to the "isolation" test in Wilsson and Sundgren (1998) and Bray et al. (2017a). It intended to capture the emotional distress caused by being isolated. This study differed from those previously published in two aspects: order and duration. In past studies, the isolation test was the first one in the test battery; therefore, the dog was not familiar with the room in that instance. In this study; however, the isolation subtest was the second last in the test battery; hence, the dog was familiarised with the test arena and the main stimuli were being left alone. Lastly, the duration of the subtest was reduced from 2 minutes to 1 minute.

Subtest 14 "noise" was based on a combination of the "loud noise" test in Wilsson and Sundgren (1997), "metallic noise" in Svartberg and Forkman (2002), "noise test" in Batt et al. (2008); Tomkins et al. (2011) and Asher et al. (2013), "acoustic startle" in Wilsson and Sinn (2012), "sudden noise" in Bray et al. (2019). This test can be considered one of the most popular in behavioural research with assistance dogs. The method used for generating a loud noise varied, for instance, Svartberg and Forkman (2002) and Bray et al. (2019) dragged a heavy metal chain while the dog was in close proximity, Batt et al. (2008); Tomkins et al. (2011) dropped a plate in an adjacent room while the dog was in the test arena and Asher et al. (2013) played a CD or aircraft noise through speakers. In particular, the design of this subtest was inspired by Wilsson and Sundgren (1997) and Wilsson and Sinn (2012), who dropped metal buckets while the dog walked on a leash. Unlike Wilsson and Sinn (2012), the handler did not drop the leash and encourage the dog to investigate the bucket; instead, they encouraged the dog to keep walking commanding "leave it" or "come on" and calling the dog's name.

A pilot study was conducted to define an optimal order for the subtests which is presented in Table 1, considering test requirements and the typical emotional response elicited. In terms of requirements, measures were taken to minimise the number of people (test leader and handler) and dogs (subject dog and distraction dog) involved. The dog's emotional response was important because it affected their engagement in the next subtest. For instance, at the end of the distractions subtest, a bowl of food is shown which generally excites the subject dog. This event can keep distracting the dogs, especially in the following subtest.

Some measures were also taken to ensure a high level of standardisation and reproducibility of the procedures with the purpose of preventing or minimising the effects of potential miscellaneous factors. For instance, the test leader briefed the handler on the test battery protocol using an information poster, while indicating the location of relevant subtests. The poster describing the order and key information about the subtests was hung on the wall, remaining visible to the handler at all times during the test battery. The test leader kept a sheet describing the order and key information on each subtest in hand at all times as well as an iPad (Apple Inc., Cupertino, California, United States), to keep track of the duration of the subtests. Moreover, the exact location of some relevant subtests was physically marked with tape on the floor.

The materials utilized are shown in Figure A.1 and the ethogram marking system in Table A.1. In order to combine information from multiple ethogram original items into one variable, composite scores were derived from a number of original items. Table A.2 describes the calculation of the 41 composite scores in more detail. Ordinal variables were

combined by calculating both their mean and product. Categorical variables were combined by assigning a numerical order to them.

Figure A.1: Materials used in the ADTB.

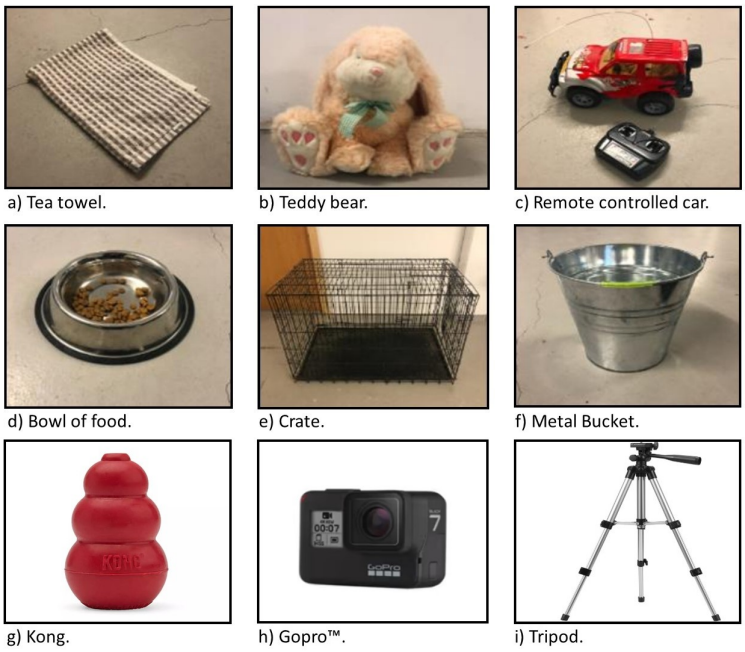


Table A.1: Detailed description of the ethogram for each of the sub-tests in the novel ADTB, including the behavioural items analysed and the marking system.

Items	Marking
1. Familiarisation	
Oriented to Handler; Exploration; Waiting (Harvey et al., 2016; Palestrini et al., 2005)	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly
Call Back-Response	1 - On the first command; 2 - On the second or more; 3 - Did not respond accordingly
2. Walking	
Distractibility	1 - Hardly distracted (1-2 times); 2 - Somewhat distracted (3-4 times); 3 - Mostly distracted (5+ times)
Pull on leash (Harvey et al., 2016)	1 - Not observed; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly
Pull strength	1 - No tension, lead relaxed; 2 - Mild tension; 3 - Moderate tension; 4 - Strong tension; 5 - Extreme tension, back legs stretched and on or more front paws raised off the floor

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Table A.1 - continued from previous page.

Items	Marking
Initiative (Bergamasco et al., 2010)	1 - Dog walks out ahead the handler; 2 - Dog walks beside/at heel with the handlers; 3 - Dog walks occasionally behind the handler, needs encouragements; 4 - Dog walks consistently behind the handler; 5 - Dog refuses to walk at times
3. Standing	
Response (Harvey et al., 2016)	1 - Poor (5+ attempts); 2 - Not great (3-4 attempts); 3 - Good (2 attempts); 4 - Excellent (1 attempt)
4. Siting	
Response (Harvey et al., 2016)	1 - Poor (5+ attempts); 2 - Not great (3-4 attempts); 3 - Good (2 attempts); 4 - Excellent (1 attempt)
5. Lying	
Response	1 - Poor (5+ attempts); 2 - Not great (3-4 attempts); 3 - Good (2 attempts); 4 - Excellent (1 attempt)
Settled	1 - Very unsettled (high level of distraction, high level of handler support); 2 - Slightly unsettled (medium level of distraction, moderate handler support); 3 - Reasonably settled (low level of distraction, minimum handler support); 4 - Very settled (no handler support)
6. Body check	
Table	1 - Refuse; 2 - Hesitant; 3 - Cooperative; 4 - Willing
Response	1 - Escaping/Not willing; 2 - Reluctant; 3 - Cooperative; 4 - Willing
Behaviours Mouths; Licks (Harvey et al., 2016)	Yes; No
7. Tea towel	
[First Response] Indifferent; Changes from Neutral; Turn head; Attempts to/Removes towel by moving; Attempts to/Removes towel with mouth; Plays (Harvey et al., 2016; Palestrini et al., 2005)	Yes; No

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Table A.1 - continued from previous page.

Items	Marking
[Second Response] Indifferent; Changes from Neutral; Turn head; Attempts to/Removes towel by moving; Attempts to/Removes towel with mouth; Plays (Harvey et al., 2016; Palestrini et al., 2005)	Yes; No
8. Distractions	
[First Response] Teddy; Human; Car; Food (Harvey et al., 2016; Foyer et al., 2016)	1 - Does not notice; 2 - Notices, does not interact; 3 - Notices, interacts, moves on quickly; 4 - Notices, interacts, moves on after a pause; 5 - Notices, interacts, moves on after some time; 6 - Notices, interacts, does not move on without serious intervention
[Second Response] Teddy; Human; Car; Food (Harvey et al., 2016; Foyer et al., 2016)	1 - Does not notice; 2 - Notices, does not interact; 3 - Notices, interacts, moves on quickly; 4 - Notices, interacts, moves on after a pause; 5 - Notices, interacts, moves on after some time; 6 - Notices, interacts, does not move on without serious intervention
Pull on leash (Harvey et al., 2016)	1 - Not observed (0) ; 2 - Rare (1-2); 3 - Sometimes (3-5); 4 - Frequent (6-8)
Pull strength (Harvey et al., 2016)	1 - No tension, lead relaxed; 2 - Mild tension; 3 - Moderate tension; 4 - Strong tension; 5 - Extreme tension, back legs stretched and on or more front paws raised off the floor
Sociability (Bergamasco et al., 2010; Foyer et al., 2016)	1 - Runs away or is afraid; 2 - Looks for the handler or is hesitant toward the person; 3 - Is indifferent; 4 - Positively looks at person, does not engage with them; 5 - Approaches the person; 6 - Is very friendly, licks the person's hands and wags its tail; 7 - Gets overly excited, jumps, mouths person
9. Kong	
Presentation Response	1 - Not interested, looks or walks away; 2 - Somewhat interested; 3 - Mostly interested; 4 - Very interested; 5 - Overly interested, dog jumps at handler
Interaction Lateralisation	None; Left; Right; Both
Interaction Response to Stimulus (Asher et al., 2013)	1 - Does not interact with Kong; 2 - Interacts with Kong, but loses interest; 3 - Interacts with Kong continuously, but calmly; 4 - Interacts with Kong continuously and intensely

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Table A.1 - continued from previous page.

Items	Marking
Interaction Response to Handler (Asher et al., 2013)	1 - Stays close to handler; 2 - Moves slightly away from handler; 3 - Takes Kong and move away from handler
Return Response to Stimulus	1 - Not bothered to let it go; 2 - Mildly reluctant, but lets it go; 3 - Moderately reluctant, but lets it go; 4 - Very reluctant, does not let it go; 5 - Extremely reluctant, does not let it go and tries to get it back
Return Response to Handler	1 - Does not follow the handler; 2 - Calmly follows the handler; 3 - Actively follows the handler; 4 - Intensely follows the handler
10. Dog distraction	
Response	1 - Cautious, seeks handler support; 2 - Not interest in other dog, does not move; 3 - Not interested in other dog, explores environment; 4 - Mildly interested in other dog, does not move; 5 - Moderately interested in other dog, moves towards dog after sometime; 6 - Very interested, moves towards dog immediately; 7 - Very excited, runs after dog instantly; 8 - Extremely excited, runs after dog instantly and plays around a lot
Call Back Response	1 - Does not leave trainer's side/comes back without being called; 2 - On the first command; 3 - On the second command or more; 4 - Does not respond accordingly
11. Crate	
Entering	1 - Without any encouragement; 2 - Needs some encouragement; 3 - Needs a lot of encouragement; 4 - Won't go in, almost forced/did not go
Settled; Sniffing/Exploring; Actively Seeking Attention; Digging; Nudging; Pawing; Whining; Barking	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly
Self-Modulation	1 - Good; 2 - Slow; 3 - Poor
Stress	1 - Settled; 2 - Mildly stressed; 3 - Moderately stressed; 4 - Extremely stressed
Urinating	Yes; No
12. Petting	
Handler-Stimulus	1 - Slightly playful; 2 - Moderately playful; 3 - Extremely playful

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Table A.1 - continued from previous page.

Items	Marking
Handler-Holding dog	1 - Never; 2 - Sometimes; 3 - Always
Confidence-During (Asher et al., 2013)	1 - Avoids, moves away; 2 - Indifferent; 3 - Slightly excited, tail wagging; 4 - Very excited, moving around; 5 - Extremely excited, jumping up, licking, mouthing
Responsiveness-After (Asher et al., 2013)	1 - Anxious; 2 - Indifferent; 3 - Explorative; 4 - Calmly interacts with the handler; 5 - Mild attention seeking; 6 - Moderate attention seeking
13. Isolation	
Time oriented; Exploration; Unsettled/Pacing; Whining; Barking (Harvey et al., 2016; Foyer et al., 2016; Katayama et al., 2016; Palestrini et al., 2005)	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly
Urinating	Yes; No
Reunion (Harvey et al., 2016)	1 - Runs away; 2 - Indifferent; 3 - Explorative; 4 - Calm approach; 5 - Activated Approach; 6 - Overly Activated Approach
14. Noise	
Confidence (Asher et al., 2013)	1 - Runs away, shakes; 2 - Moves away, avoids; 3 - Indifferent; 4 - Minor reaction; 5 - Moderate reaction; 6 - Strong reaction (jumps, runs to/paws at the source of the sound, vocalises)

All variables had an NA option. The variables recorded were classified into ordinal variables and categorical variables depending on whether numbers were used or not: Ordinal variables - all markings with numbers; Categorical variables - all markings without number.

Table A.2: Composite scores originated from ADTB ethogram items presented in Table A.1. For numerical ethogram items, composite scores were calculated by taking the mean and product between them. For categorical ethogram items, composite scores were derived by assigning numbers to categories in a meaningful way.

Composite scores (calculated)	Ethogram items (original)
1. Familiarisation	
S Familiarisation Handler_mean	Oriented to Handler
S Familiarisation Handler_prod	Waiting
2. Walking	
S Walking Pull_mean	Walking Pull on leash
S Walking Pull_prod	Walking Pull strength
3-5. Standing, Sitting, Lying	

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Table A.2 - continued from previous page

Composite scores (calculated)	Ethogram items (original)
S Obedience_mean S Obedience_prod	Standing Response Sitting Response Lying Response
	6. Body check
S Sensitivity_mean	Table Response
	7. Tea towel
S Tea Towel First Response	(Mean for [First Response] of the following) Indifferent (replace: Yes = 1, No = 0) Change from Neutral (replace: Yes = 2, No = 0) Turns head (replace: Yes = 3, No = 0) Attempts to/Removes towel by moving (replace: Yes = 4, No = 0) Attempts to/Removes towel with mouth (replace Yes = 5, No = 0) Plays (replace: Yes = 6, No = 0)
S Tea Towel Second Response	(Mean for [Second Response] of the following) Indifferent (replace: Yes = 1, No = 0) Change from Neutral (replace: Yes = 2, No = 0) Turns head (replace: Yes = 3, No = 0) Attempts to/Removes towel by moving (replace: Yes = 4, No = 0) Attempts to/Removes towel with mouth (replace Yes = 5, No = 0) Plays (replace: Yes = 6, No = 0)
	8. Distractions
S Distractions First Response_mean S Distractions First Response_prod	[First Response] Teddy Human Car Food
S Distractions Second Response_mean S Distractions Second Response_prod	[Second Response] Teddy Human Car Food
S Distractions Difference_mean	(Mean of the differences between individual responses, i.e.: [Second Response] [First Response]) Teddy Human Car Food
S Distractions Pull_mean S Distractions Pull_prod	Distractions Pull on leash Distractions Pull strength
S Walking Distractions Pull_mean	S Distractions Pull_mean S Walking Pull_mean
S Walking Distractions Pull_prod	S Distractions Pull_prod S Walking Pull_prod
	9. Kong
S Kong Response_mean S Kong Response_prod	Presentation Response Interaction Response to stimulus Interaction Back Return Handler
	10. Dog distraction

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Table A.2 - continued from previous page

Composite scores (calculated)	**Ethogram items (original)**
S Dog Distraction_mean	Response
S Dog Distraction_prod	Call Back Response
S Call Response_mean	Familiarisation Call Back Response
S Call Response_prod	Dog Call Back Response
S Familiarisation Dog Call	(Difference between the following) Familiarisation Call Back Response Dog Call Back Response
	11. Crate
S Crate Response_mean S Crate Response_prod	Entering Self-Modulation Stress Settled (in reverse order)
S Crate Stimulus_mean S Crate Stimulus_prod	Sniffing/Exploring Digging Nudging Crate Pawing
S Crate Handler_mean S Crate Handler_prod	Actively Seeking Attention Whining Barking
	12. Petting
S Petting Stimulus During_mean	Handler Stimulus
S Petting Stimulus During_prod	Confidence During
S Petting Engagement During_mean	Handler Holding dog
S Petting Engagement During_prod	Confidence During
S Petting After_mean	Handler Holding dog
S Petting After_prod	Responsiveness After
S Sociability_mean S Sociability_prod	Confidence During Responsiveness After Reunion Response
	13. Isolation
S Isolation Handler_mean	Time oriented Whining Barking
S Isolation Stimulus	(Difference between the following) Exploration Unsettled/Pacing

B. Data Collection 1

B.1. Descriptive Statistics

Table A.1 shows the ethogram used to mark the behaviours shown in each subtest. Table B.1 shows descriptive statistics of the ordinal ethogram items and composite scores of the data from DC1, including the minimum, 1st quartile, median, mean, 3rd quartile, maximum and number of missing values for all ethogram items and scores. Table B.2 shows descriptive statistics of the categorical variables including the number of dogs who scored "Yes", or "No", or are missing the score. The only categorical variable which has different categories is "Kong - Interaction Lateralisation", therefore the descriptive statistics are shown in Table B.3.

Table B.1: Descriptive statistics for numerical variables of the ADTB ethogram at DC1, including minimum, 1st quartile, median, mean, 3rd quartile, maximum, and number of missing values for all items and scores.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs
Familiarisation Response Oriented to Handler	1.00	1.50	2.00	2.24	3.00	5.00	3 (0.03)
Familiarisation Response Exploration	1.00	4.00	5.00	4.29	5.00	5.00	0 (0.00)
Familiarisation Response Waiting	1.00	1.00	1.00	1.52	2.00	5.00	1 (0.01)
Call Back Response	1.00	1.00	1.00	1.33	2.00	3.00	15 (0.15)
Walking Distractibility	1.00	1.00	2.00	1.92	3.00	3.00	0 (0.00)
Walking Pull on leash	1.00	1.00	1.50	1.89	3.00	4.00	0 (0.00)
Walking Pull strength	1.00	1.00	1.00	1.62	2.00	4.00	0 (0.00)
Walking Initiative	1.00	2.00	2.00	2.42	3.00	5.00	0 (0.00)
Standing Response	1.00	2.00	2.00	2.48	3.00	4.00	0 (0.00)
Sitting Response	1.00	2.00	3.00	2.56	3.25	4.00	2 (0.02)
Lying Response	1.00	2.00	3.00	2.66	4.00	4.00	0 (0.00)
Lying Settled	1.00	1.00	2.00	2.29	3.00	4.00	2 (0.02)
Body check Table	1.00	3.00	4.00	3.30	4.00	4.00	5 (0.05)
Body check Response	1.00	3.00	3.00	2.93	3.00	4.00	0 (0.00)
Distractions First Response Teddy	1.00	3.00	4.00	3.67	4.75	6.00	0 (0.00)
Distractions First Response Human	2.00	3.00	3.00	3.36	4.00	5.00	0 (0.00)
Distractions First Response Car	1.00	2.25	3.00	3.12	4.00	6.00	0 (0.00)
Distractions First Response Food	1.00	4.00	4.00	4.22	5.00	6.00	0 (0.00)
Distractions Second Response Teddy	1.00	2.00	3.00	2.69	3.00	6.00	0 (0.00)
Distractions Second Response Human	1.00	2.00	3.00	2.95	4.00	5.00	1 (0.01)
Distractions Second Response Car	1.00	2.00	3.00	2.61	3.00	5.00	1 (0.01)
Distractions Second Response Food	1.00	3.00	4.00	3.79	5.00	6.00	2 (0.02)
Distractions Pull on leash	1.00	3.00	3.00	3.00	3.75	4.00	0 (0.00)
Distractions Pull strength	1.00	3.00	3.00	3.52	5.00	5.00	0 (0.00)
Distractions Human	3.00	4.00	5.00	5.24	6.00	7.00	0 (0.00)
Kong Presentation Response	1.00	2.00	4.00	3.52	5.00	5.00	0 (0.00)
Kong Interaction Response to stimulus	1.00	3.00	3.00	2.95	3.00	4.00	1 (0.01)
Kong Interaction Response to handler	1.00	1.00	1.00	1.55	2.00	3.00	2 (0.02)
Kong Interaction Back	1.00	1.00	1.00	1.56	2.00	5.00	4 (0.04)
Kong Return Handler	1.00	2.00	2.00	2.14	2.00	4.00	4 (0.04)
Dog Response	1.00	4.00	5.00	4.91	6.00	8.00	0 (0.00)
Dog Call Back Response	1.00	1.00	2.00	1.83	2.00	4.00	5 (0.05)
Crate Entering	1.00	1.00	1.00	1.44	2.00	4.00	1 (0.01)
Crate Settled	1.00	1.00	2.00	2.23	3.00	5.00	2 (0.02)
Crate Sniffing Exploring	1.00	2.00	3.00	2.72	3.00	5.00	2 (0.02)
Crate Actively Seeking Attention	1.00	1.00	1.00	2.06	3.00	5.00	3 (0.03)
Crate Digging	1.00	1.00	1.00	1.14	1.00	4.00	2 (0.02)
Crate Nudging Crate	1.00	1.00	1.00	1.18	1.00	3.00	2 (0.02)
Crate Pawing	1.00	1.00	1.00	1.26	1.00	4.00	2 (0.02)

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Table B.1 - continued from previous page.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs (%)
Crate Whining	1.00	1.00	1.00	1.89	3.00	5.00	8 (0.08)
Crate Barking	1.00	1.00	1.00	1.48	1.00	5.00	3 (0.03)
Crate Self Modulation	1.00	1.00	2.00	2.06	3.00	3.00	2 (0.02)
Crate Stress	1.00	2.00	2.00	2.30	3.00	4.00	2 (0.02)
Petting Handler Stimulus	1.00	1.00	1.00	1.18	1.00	3.00	1 (0.01)
Petting Handler Holding dog	1.00	1.00	1.00	1.16	1.00	3.00	1 (0.01)
Petting Confidence During	1.00	3.00	3.00	3.04	3.00	5.00	1 (0.01)
Petting Responsiveness After	1.00	3.00	4.00	3.76	4.00	6.00	2 (0.02)
Isolation Response Time oriented	1.00	3.00	4.00	3.94	5.00	5.00	2 (0.02)
Isolation Response Exploration	1.00	1.00	2.00	2.09	3.00	5.00	1 (0.01)
Isolation Response Unsettled Pacing	1.00	1.00	2.00	1.96	2.00	5.00	1 (0.01)
Isolation Response Whining	1.00	1.00	2.00	2.02	3.00	5.00	8 (0.08)
Isolation Response Barking	1.00	1.00	1.00	1.46	1.00	5.00	1 (0.01)
Isolation Reunion	1.00	4.00	4.00	4.20	5.00	6.00	2 (0.02)
Noise Confidence	3.00	4.00	4.00	3.88	4.00	6.00	1 (0.01)
S Familiarisation Handler_mean	1.00	1.00	1.50	1.87	2.50	5.00	1 (0.01)
S Familiarisation Handler_prod	1.00	1.00	2.00	3.83	4.00	25.00	0 (0.00)
S Walking Pull_mean	1.00	1.00	1.50	1.76	2.50	4.00	0 (0.00)
S Walking Pull_prod	1.00	1.00	2.00	3.72	6.00	16.00	0 (0.00)
S Distractions Pull_mean	1.00	3.00	3.00	3.26	4.00	4.50	0 (0.00)
S Distractions Pull_prod	1.00	9.00	9.00	11.15	15.00	20.00	0 (0.00)
S Walking Distractions Pull_mean	-2.00	1.00	1.50	1.51	2.00	3.50	0 (0.00)
S Walking Distractions Pull_prod	-12.00	3.00	8.00	7.43	11.00	19.00	0 (0.00)
S Obedience_mean	1.00	2.00	2.67	2.56	3.00	4.00	0 (0.00)
S Obedience_prod	1.00	6.50	12.00	17.58	24.00	64.00	0 (0.00)
S Sensitivity_mean	1.50	3.00	3.00	3.11	3.50	4.00	0 (0.00)
S Tea Towel First Response	0.00	1.00	1.67	1.68	2.50	3.50	1 (0.01)
S Tea Towel Second Response	0.00	0.50	1.67	1.48	2.50	3.50	3 (0.03)
S Distractions First Response_mean	2.00	3.00	3.50	3.59	4.25	5.50	0 (0.00)
S Distractions First Response_prod	8.00	61.00	144.00	190.66	256.00	900.00	0 (0.00)
S Distractions Second Response_mean	1.50	2.50	3.00	3.02	3.50	5.50	0 (0.00)
S Distractions Second Response_prod	3.00	24.00	54.00	98.14	108.00	600.00	0 (0.00)
S Distractions Difference_mean	-2.50	-1.00	-0.58	-0.58	-0.25	1.75	0 (0.00)
S Kong Response_mean	1.33	2.00	2.50	2.55	2.75	4.25	0 (0.00)
S Kong Response_prod	2.00	12.00	24.00	39.59	48.00	300.00	0 (0.00)
S Dog Distraction_mean	1.00	2.50	3.50	3.45	4.00	6.00	0 (0.00)
S Dog Distraction_prod	1.00	4.00	6.00	9.27	12.00	32.00	0 (0.00)
S Call Response_mean	1.00	1.00	1.50	1.59	2.00	3.00	2 (0.02)
S Call Response_prod	1.00	1.00	2.00	2.35	3.00	8.00	0 (0.00)
S Familiarisation Dog Call	-3.00	-1.00	0.00	-0.56	0.00	1.00	18 (0.18)
S Crate Response_mean	0.75	1.75	2.25	2.16	2.75	4.00	1 (0.01)
S Crate Response_prod	0.00	4.00	16.00	25.19	27.00	144.00	0 (0.00)
S Crate Stimulus_mean	1.25	1.25	1.50	1.57	1.75	3.25	2 (0.02)
S Crate Stimulus_prod	1.00	2.00	3.00	6.24	4.00	108.00	0 (0.00)
S Crate Handler_mean	1.00	1.00	1.33	1.80	2.42	4.00	2 (0.02)
S Crate Handler_prod	1.00	1.00	2.00	9.27	9.00	60.00	0 (0.00)
S Petting Stimulus During_mean	1.00	2.00	2.00	2.11	2.50	4.00	1 (0.01)
S Petting Stimulus During_prod	1.00	3.00	3.00	3.67	4.00	15.00	0 (0.00)
S Petting Engagement During_mean	1.00	2.00	2.00	2.10	2.50	3.50	1 (0.01)
S Petting Engagement During_prod	1.00	3.00	3.00	3.49	4.00	10.00	0 (0.00)

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Table B.1 - continued from previous page.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs (%)
S Petting After_mean	1.00	2.00	2.50	2.45	2.50	3.50	1 (0.01)
S Petting After_prod	1.00	3.00	4.00	4.26	4.00	12.00	0 (0.00)
S Isolation Handler_mean	1.00	2.00	2.33	2.47	3.00	4.33	1 (0.01)
S Isolation Handler_prod	1.00	4.00	8.00	12.24	15.75	75.00	0 (0.00)
S Isolation Stimulus	-4.00	-1.00	0.00	0.13	1.00	3.00	1 (0.01)
S Sociability_mean	2.00	3.33	3.67	3.67	4.00	5.33	0 (0.00)
S Sociability_prod	4.00	36.00	48.00	49.07	60.00	150.00	0 (0.00)

Table B.2: Descriptive statistics for categorical variables of the ADTB ethogram at DC1, including the number of No, Yes and missing data.

Variable	No	Yes	NAs (%)
Body check General Mouths	94	3	1 (0.01)
Body check General Licks	84	13	1 (0.01)
Tea Towel First Response Indifferent	87	10	1 (0.01)
Tea Towel First Response Change from Neutral	13	84	1 (0.01)
Tea Towel First Response Turns head	17	80	1 (0.01)
Tea Towel First Response Attempts to Removes towel by moving	48	49	1 (0.01)
Tea Towel First Response Attempts to Removes towel with mouth	52	45	1 (0.01)
Tea Towel First Response Plays	87	10	1 (0.01)
Tea Towel Second Response Indifferent	71	24	3 (0.03)
Tea Towel Second Response Turns head	31	64	3 (0.03)
Tea Towel Second Response Change from Neutral	26	69	3 (0.03)
Tea Towel Second Response Attempts to Removes towel by moving	50	45	3 (0.03)
Tea Towel Second Response Attempts to Removes towel with mouth	58	37	3 (0.03)
Tea Towel Second Response Plays	82	13	3 (0.03)
Crate Urinating	95	1	2 (0.02)
Isolation Urinating	97	1	1 (0.01)

Table B.3: Descriptive statistics for the ethogram variable Kong Interaction Lateralisation of the ADTB ethogram at DC1, including the number of dogs in the sample per category.

Variable	None	Both	Right	Left
Kong - Interaction Lateralisation	43	10	22	17

B.2. Feature Selection

Multiple models were built using each ethogram variable individually to predict the probability of withdrawal from training. The results from the univariate logistic regression models are shown in Tables B.4, B.5 and B.6. It includes the model estimate, p-value, Odds Ratio, and the lower 2.5% and upper 97.5% bounds of the Confidence Interval (CI). Positive estimates indicate that the variable was positively associated with a higher probability of withdrawal. Negative estimates suggest that the variable was negatively associated with a higher probability of withdrawal. The p-value shows the level of significance of this relationship.

Table B.4: ADTB univariate logistic regression model estimates, p-value, Odds Ratio (OR), and Confidence Interval (CI).

Variable	Estimate	p-value	OR	2.5 %	97.5 %
Items - Ordinal					

Continued on next page.

Table B.4 - continued from previous page.

Variable	Estimate	p-value	OR	2.5 %	97.5 %
Familiarisation Response Oriented to Handler	0.24	0.27	1.28	0.82	1.96
Familiarisation Response Exploration	-0.32	0.15	0.73	0.47	1.14
Familiarisation Response Waiting	0.20	0.50	1.22	0.66	2.13
Call Back Response	0.20	0.68	1.22	0.43	3.11
Walking Distractibility	0.07	0.82	1.07	0.58	1.98
Walking Pull on leash	-0.10	0.69	0.91	0.54	1.45
Walking Pull strength	-0.12	0.72	0.88	0.43	1.69
Walking Initiative	0.45	0.17	1.56	0.83	3.00
Standing Response	0.11	0.65	1.12	0.70	1.80
Sitting Response	0.01	0.97	1.01	0.64	1.59
Lying Response	0.05	0.82	1.05	0.69	1.62
Lying Settled	0.20	0.43	1.22	0.75	2.00
Body check Table **	-0.48	0.07	0.62	0.37	1.05
Body check Response	-0.19	0.59	0.83	0.42	1.69
Distractions First Response Teddy	-0.09	0.59	0.91	0.65	1.28
Distractions First Response Human *	-0.40	0.15	0.67	0.38	1.14
Distractions First Response Car	-0.30	0.25	0.74	0.44	1.22
Distractions First Response Food	0.12	0.54	1.13	0.78	1.71
Distractions Second Response Teddy	-0.02	0.92	0.98	0.68	1.39
Distractions Second Response Human	-0.38	0.19	0.69	0.38	1.18
Distractions Second Response Car	0.02	0.95	1.02	0.60	1.69
Distractions Second Response Food	0.20	0.31	1.22	0.84	1.81
Distractions Pull on leash	-0.44	0.19	0.65	0.33	1.24
Distractions Human	-0.34	0.19	0.71	0.42	1.18
Kong Presentation Response	0.11	0.57	1.12	0.77	1.64
Kong Interaction Response to stimulus	0.01	0.99	1.01	0.40	2.71
Kong Interaction Response to handler	0.03	0.91	1.03	0.57	1.79
Kong Interaction Back	0.22	0.34	1.25	0.76	1.97
Kong Return Handler	0.40	0.47	1.49	0.47	4.35
Dog Response	-0.11	0.56	0.90	0.61	1.30
Dog Call Back Response	0.02	0.94	1.02	0.58	1.74
Crate Entering	0.16	0.67	1.17	0.54	2.36
Crate Behaviours Settled	0.03	0.89	1.03	0.66	1.57
Crate Behaviours Sniffing Exploring **	0.59	0.06	1.80	0.99	3.37
Crate Behaviours Actively Seeking Attention *	-0.37	0.12	0.69	0.41	1.06
Crate Behaviours Digging	0.48	0.25	1.62	0.66	3.71
Crate Behaviours Whining	-0.19	0.47	0.83	0.47	1.34
Crate Behaviours Barking	-0.31	0.32	0.73	0.34	1.24
Crate Self Modulation	-0.22	0.49	0.81	0.43	1.50
Crate Behaviours Nudging Crate	0.57	0.19	1.77	0.71	4.15
Crate Behaviours Pawing	0.01	0.98	1.01	0.40	2.08
Crate Stress	-0.21	0.55	0.81	0.40	1.59
Petting Handler Stimulus *	-1.56	0.14	0.21	0.01	1.08
Petting Handler Holding dog	0.73	0.15	2.07	0.73	5.73
Petting Confidence During ***	-0.66	0.03	0.51	0.28	0.91
Petting Responsiveness After	-0.41	0.17	0.67	0.37	1.17
Isolation Response Time oriented	-0.05	0.85	0.95	0.56	1.65
Isolation Response Exploration	0.06	0.80	1.06	0.66	1.68
Isolation Response Unsettled Pacing	0.12	0.63	1.13	0.67	1.82
Isolation Response Whining	-0.17	0.53	0.85	0.49	1.40
Isolation Response Barking	0.07	0.76	1.08	0.64	1.68
Isolation Reunion	0.00	0.99	1.00	0.57	1.86
Noise Confidence	-0.20	0.60	0.82	0.36	1.69
Scores					
S Familiarisation Handler_mean	0.31	0.27	1.36	0.77	2.35

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Table B.4 - continued from previous page.

Variable	Estimate	p-value	OR	2.5 %	97.5 %
S Familiarisation Handler_prod	0.04	0.46	1.04	0.93	1.16
S Walking Pull_mean	-0.12	0.70	0.89	0.48	1.56
S Walking Pull_prod	0.00	0.96	1.00	0.87	1.14
S Distractions Pull_mean **	-0.58	0.05	0.56	0.30	0.99
S Distractions Pull_prod	-0.10	0.06	0.91	0.82	1.00
S Walking Distractions Pull_mean	-0.35	0.16	0.70	0.42	1.15
S Walking Distractions Pull_prod **	-0.09	0.06	0.91	0.83	1.00
S Obedience_mean	0.17	0.65	1.18	0.58	2.44
S Obedience_prod	-0.00	0.97	1.00	0.97	1.03
S Sensitivity_mean **	-0.83	0.06	0.43	0.17	1.03
S Tea Towel First Response	-0.30	0.24	0.74	0.44	1.21
S Tea Towel Second Response	-0.08	0.72	0.92	0.59	1.43
S Distractions First Response_mean	-0.26	0.43	0.77	0.39	1.45
S Distractions First Response_prod	-0.00	0.30	1.00	0.99	1.00
S Distractions Second Response_mean	-0.02	0.94	0.98	0.53	1.74
S Distractions Second Response_prod	-0.00	0.37	1.00	0.99	1.00
S Distractions Difference_mean	0.29	0.40	1.34	0.67	2.67
S Kong Response_mean	0.34	0.43	1.41	0.59	3.31
S Kong Response_prod	0.01	0.23	1.01	1.00	1.01
S Dog Distraction_mean	-0.03	0.90	0.97	0.60	1.54
S Dog Distraction_prod	-0.01	0.80	0.99	0.91	1.07
S Call Response_mean	-0.05	0.91	0.96	0.41	2.10
S Call Response_prod	-0.01	0.97	0.99	0.73	1.30
S Familiarisation Dog Call	-0.05	0.87	0.95	0.55	1.70
S Crate Response_mean	0.01	0.97	1.01	0.48	2.12
S Crate Response_prod	-0.01	0.22	0.99	0.96	1.01
S Crate Stimulus_mean **	0.97	0.08	2.65	0.86	8.37
S Crate Stimulus_prod	0.01	0.38	1.01	0.98	1.05
S Crate Handler_mean	-0.41	0.18	0.66	0.34	1.16
S Crate Handler_prod	-0.03	0.19	0.97	0.91	1.01
S Petting Stimulus During_mean ***	-1.31	0.02	0.27	0.08	0.75
S Petting Stimulus During_prod **	-0.39	0.06	0.68	0.43	0.95
S Petting Engagement During_mean	-0.78	0.16	0.46	0.15	1.33
S Petting Engagement During_prod	-0.11	0.51	0.89	0.61	1.21
S Petting After_mean	-0.25	0.63	0.78	0.28	2.18
S Petting After_prod	0.09	0.51	1.09	0.82	1.41
S Isolation Handler_mean	-0.08	0.84	0.93	0.43	1.95
S Isolation Handler_prod	-0.00	0.98	1.00	0.96	1.04
S Isolation Stimulus	-0.03	0.88	0.97	0.67	1.41
S Sociability_mean **	-0.76	0.06	0.47	0.21	1.01
S Sociability_prod *	-0.02	0.14	0.98	0.96	1.00
Items - Categorical					
Body check General Mouths	-15.32	0.99	0.00		
Body check General Licks	-1.32	0.22	0.27	0.01	1.48
Tea Towel First Response Indifferent *	1.01	0.15	2.75	0.64	10.73
Tea Towel First Response Change from Neutral	-0.56	0.40	0.57	0.16	2.31
Tea Towel First Response Turns head	-0.13	0.84	0.88	0.27	3.42
Tea Towel First Response Attempts to Removes towel by moving	-0.15	0.76	0.86	0.32	2.28
Tea Towel First Response Attempts to Removes towel with mouth	-0.69	0.18	0.50	0.17	1.34
Tea Towel First Response Plays	-0.99	0.36	0.37	0.02	2.16
Tea Towel Second Response Indifferent	-0.02	0.98	0.98	0.29	2.93
Tea Towel Second Response Turns head	0.15	0.78	1.17	0.41	3.63
Tea Towel Second Response Change from Neutral	0.15	0.79	1.17	0.39	3.95
Tea Towel Second Response Attempts to Removes towel by moving	-0.65	0.22	0.52	0.18	1.43
Tea Towel Second Response Attempts to Removes towel with mouth	-0.21	0.68	0.81	0.28	2.21

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Table B.4 - continued from previous page.

Variable	Estimate	p-value	OR	2.5 %	97.5 %
Tea Towel Second Response Plays	0.14	0.85	1.15	0.24	4.25
Crate Urinating	-14.18	0.99	0.00		
Sex	0.62	0.22	1.85	0.70	5.16

95% CI: lower 2.5% and upper 97.5%. Statistically significant with $p < 0.05$ (***), $p < 0.10$ (**), $p < 0.15$ (*).

Table B.5: Univariate logistic regression model using the demographic variable Breed as a predictor of the probability of withdrawal, including estimates, p-value, Odds Ratio (OR), and Confidence Interval (CI).

Variable	Estimate	P-value	OR	2.5 %	97.5 %
Intercept	-0.00	1.00	1.00	0.04	25.29
LR	-0.95	0.51	0.39	0.01	10.31
LRxGR	-1.73	0.24	0.18	0.01	4.80

Table B.6: Univariate logistic regression model using the variable Kong Interaction Lateralisation as a predictor of the probability of withdrawal. Model parameters reported include estimates, p-value, Odds Ratio (OR), and Confidence Interval (CI).

Variable	Estimate	P-value	OR	2.5 %	97.5 %
Intercept	-1.39	0.08	0.25	0.04	1.00
Left	0.78	0.41	2.18	0.38	17.65
None	-0.62	0.51	0.54	0.10	4.24
Right	0.41	0.66	1.50	0.27	11.84

Figure B.1: Correlation matrix for the numerical variables in Step 3 of feature selection.

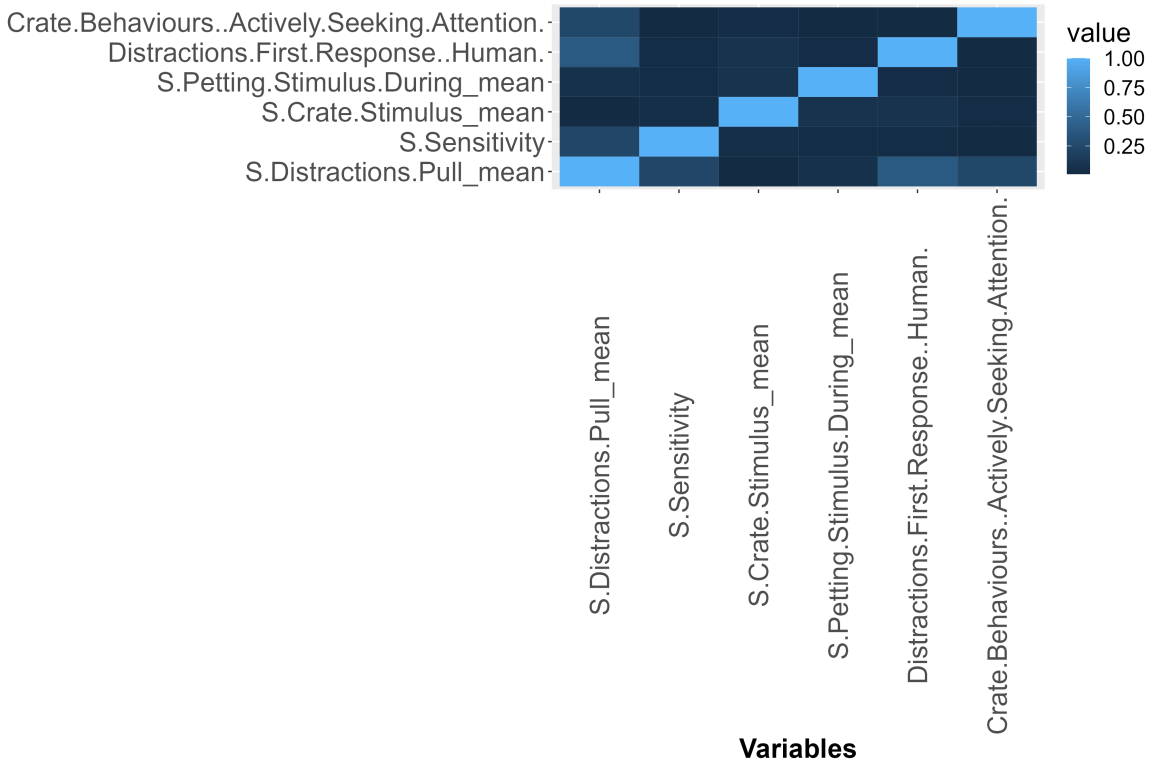


Table B.7
Variables that satisfied the three-step feature selection strategy in DC1.

Variable	Step 1	Step 2	Step 3	RFE
S Sensitivity_mean	Yes	Yes	Yes	Yes
Body check Table	Yes	No	-	-
Tea Towel First Response Indifferent	Yes	Yes	Yes	No
Distractions First Response Human	Yes	Yes	Yes	No
S Distractions Pull_mean	Yes	Yes	Yes	Yes
S Distractions Pull_prod	Yes	No	-	-
S Walking Distractions Pull_prod	Yes	No	-	-
S Crate Stimulus_mean	Yes	Yes	Yes	Yes
Crate Sniffing Exploring	Yes	No	-	-
Crate Actively Seeking Attention	Yes	Yes	Yes	No
S Petting Stimulus During_mean	Yes	Yes	Yes	Yes
S Petting Stimulus During_prod	Yes	No	-	-
S Sociability_mean	Yes	No	-	-
S Sociability_prod	Yes	No	-	-
Petting Handler Stimulus	Yes	No	-	-
Petting Confidence During	Yes	No	-	-

B.3. Optimal Model

For ease of reference, Table B.8 combines key information from both the original ethogram items used to calculate the composite scores as shown in Table A.2 and the ethogram item in Table A.1. Table B.9 shows the results of the feature importance analysis of the optimal multivariate logistic regression model.

Table B.8: Composite scores, original ethogram items, and their respective marking for the variables chosen for the optimal model built on the DC1 dataset.

Subtest	Items	Marking
S Sensitivity_mean		
6. Body check	Table	1 - Refuse 2 - Hesitant 3 - Cooperative 4 - Willing
	Response	1 - Escaping/Not willing 2 - Reluctant 3 - Cooperative 4 - Willing
S Distractions Pull_mean		
8. Distractions	Pull on leash	1 - Not observed (0) 2 - Rare (1-2) 3 - Sometimes (3-5) 4 - Frequent (6-8)
	Pull strength	1 - No tension, lead relaxed 2 - Mild tension 3 - Moderate tension 4 - Strong tension 5 - Extreme tension, back legs stretched, and one or more front paws raised off the floor

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Table B.8 - continued from previous page.

Subtest	Items	Marking
S Crate Stimulus_mean		
11. Crate	Sniffing/Exploring Digging Nudging Crate Pawing	1 - Never 2 - Rarely 3 - Occasionally 4 - Regularly 5 - Constantly
S Petting Stimulus During_mean		
12. Petting	Handler-Stimulus	1 - Slightly playful 2 - Moderately playful 3 - Extremely playful
	Confidence-During	1 - Avoids, moves away 2 - Indifferent 3 - Slightly excited, tail wagging 4 - Very excited, moving around 5 - Extremely excited, jumping up, licking, mouthing

Table B.9: Importance of features in the optimal model built on the DC1 dataset.

Variable	Importance
S Distractions Pull_mean	2.89
S Petting Stimulus During_mean	2.40
S Sensitivity_mean	2.00
S Crate Stimulus_mean	1.54

B.4. Visualisation

Figures B.2 to B.8 show the variables selected for the reduced dataset created with DC1 data. These variables were rated following the scales presented in Table A.1.

Figure B.2: Bar chart and box plot of the distribution of the ADTB item "Tea Towel First Response Indifferent" at DC1 in relation to working outcomes.

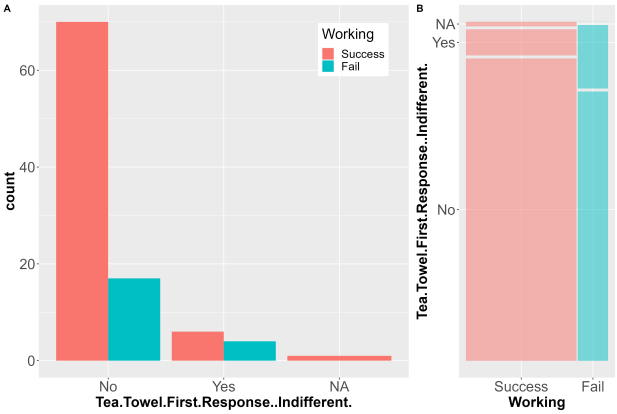


Figure B.3: Bar chart and box plot of the distribution of the ADTB item "Distractions First Response - Human" at DC1 in relation to working outcomes.



Figure B.4: Bar chart and box plot of the distribution of the ADTB item "Crate Behaviours - Actively Seeking Attention" at DC1 in relation to working outcomes.



Figure B.5: Bar chart and box plot of the distribution of the ADTB score "S Distractions Pull_mean" at DC1 in relation to working outcomes.

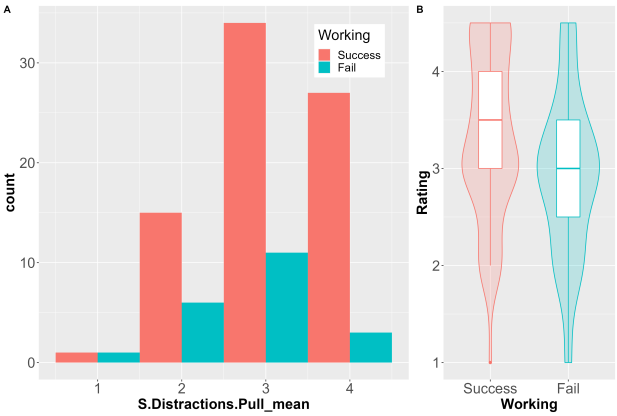


Figure B.6: Bar chart and box plot of the distribution of the ADTB score "S Sensitivity" at DC1 in relation to working outcomes.

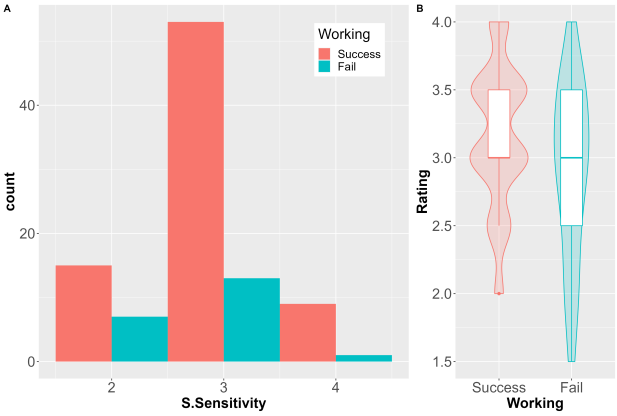


Figure B.7: Bar chart and box plot of the distribution of the ADTB score "S Crate Stimulus_mean" at DC1 in relation to working outcomes.

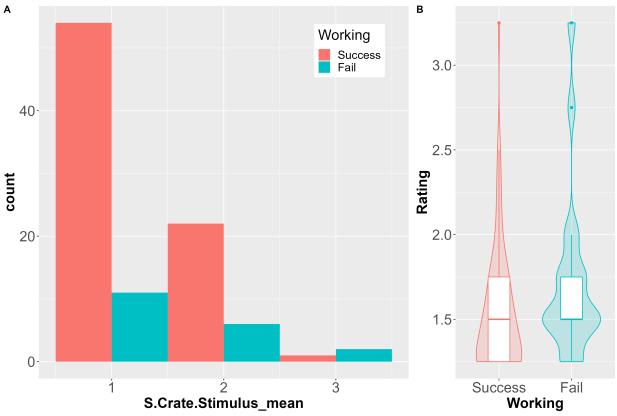
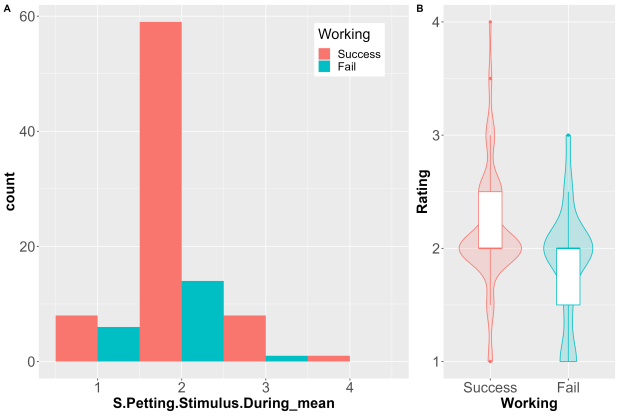


Figure B.8: Bar chart and box plot of the distribution of the ADTB score "S Petting Stimulus During_mean" at DC1 in relation to working outcomes.



C. Data Collection 2

Table A.1 shows the ethogram used to mark the behaviours shown in each subtest.

C.1. Descriptive Statistics

Table C.1 shows descriptive statistics of the ordinal ethogram items and composite scores of the data from DC2, including the minimum, 1st quartile, median, mean, 3rd quartile, maximum and number of missing values for all ethogram items and scores. Table C.2 shows descriptive statistics of the categorical variables including the number of dogs who scored "Yes", "No" or are missing the score. The only categorical variable which has different categories is "Kong Interaction Lateralisation", therefore the descriptive statistics are shown in Table C.3.

Table C.1: Descriptive statistics for numerical variables of the ADTB ethogram at DC2 including minimum, 1st quartile, median, mean, 3rd quartile, maximum, and number of missing values for all items and scores.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs (%)
Familiarisation Response Oriented to Handler	1.00	1.00	2.00	2.29	3.00	5.00	1 (0.02)
Familiarisation Response Exploration	1.00	4.00	5.00	4.39	5.00	5.00	1 (0.02)
Familiarisation Response Waiting	1.00	1.00	1.00	1.41	2.00	5.00	1 (0.02)
Call Back Response	1.00	1.00	1.00	1.15	1.00	2.00	8 (0.13)
Walking Distractibility	1.00	1.00	2.00	1.82	2.00	3.00	0 (0.00)
Walking Pull on leash	1.00	1.00	2.00	1.77	2.00	4.00	0 (0.00)
Walking Pull strength	1.00	1.00	1.50	1.53	2.00	3.00	0 (0.00)
Walking Initiative	1.00	2.00	2.00	2.22	3.00	4.00	0 (0.00)
Standing Response	1.00	2.00	3.00	2.80	4.00	4.00	0 (0.00)
Sitting Response	1.00	2.00	3.00	2.88	4.00	4.00	0 (0.00)
Lying Response	1.00	2.00	3.00	2.97	4.00	4.00	0 (0.00)
Lying Settled	1.00	1.00	3.00	2.53	3.00	4.00	0 (0.00)
Body check Table	1.00	3.00	4.00	3.40	4.00	4.00	0 (0.00)
Body check Response	1.00	3.00	3.00	3.07	3.00	4.00	0 (0.00)
Distractions First Response Teddy	1.00	2.00	3.00	3.02	4.00	6.00	0 (0.00)
Distractions First Response Human	2.00	3.00	3.00	3.30	4.00	5.00	0 (0.00)
Distractions First Response Car	1.00	2.00	3.00	2.97	4.00	6.00	0 (0.00)
Distractions First Response Food	1.00	3.00	4.00	3.90	5.00	6.00	0 (0.00)
Distractions Second Response Teddy	1.00	1.00	2.00	2.30	3.00	6.00	0 (0.00)
Distractions Second Response Human	1.00	2.00	3.00	2.78	3.00	5.00	0 (0.00)
Distractions Second Response Car	1.00	2.00	2.00	2.47	3.00	6.00	0 (0.00)
Distractions Second Response Food	1.00	2.00	3.00	3.32	4.00	6.00	0 (0.00)
Distractions Pull on leash	1.00	2.00	2.50	2.57	3.00	4.00	0 (0.00)
Distractions Pull strength	1.00	2.00	3.00	3.18	4.00	5.00	0 (0.00)
Distractions Human	4.00	4.00	5.00	5.07	6.00	7.00	0 (0.00)
Kong Presentation Response	2.00	2.00	4.00	3.58	4.25	5.00	0 (0.00)
Kong Interaction Response to stimulus	2.00	3.00	3.00	3.07	3.00	4.00	1 (0.02)
Kong Interaction Response to handler	1.00	1.00	1.00	1.65	2.00	3.00	0 (0.00)
Kong Interaction Back	1.00	1.00	1.00	1.61	2.00	5.00	1 (0.02)
Kong Return Handler	2.00	2.00	2.00	2.12	2.00	4.00	1 (0.02)
Dog Response	1.00	4.00	5.00	4.87	6.00	8.00	0 (0.00)
Dog Call Back Response	1.00	1.00	1.00	1.62	2.00	4.00	4 (0.07)
Crate Entering	1.00	1.00	1.00	1.22	1.00	3.00	0 (0.00)
Crate Settled	1.00	2.00	3.00	2.58	4.00	5.00	0 (0.00)
Crate Sniffing Exploring	1.00	2.00	2.00	2.40	3.00	4.00	0 (0.00)
Crate Actively Seeking Attention	1.00	1.00	1.00	1.83	3.00	5.00	0 (0.00)
Crate Digging	1.00	1.00	1.00	1.15	1.00	3.00	0 (0.00)
Crate Nudging Crate	1.00	1.00	1.00	1.22	1.00	3.00	0 (0.00)

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Table C.1 - continued from previous page.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs (%)
Crate Pawing	1.00	1.00	1.00	1.22	1.00	3.00	0 (0.00)
Crate Whining	1.00	1.00	1.00	1.68	2.00	5.00	3 (0.05)
Crate Barking	1.00	1.00	1.00	1.15	1.00	5.00	0 (0.00)
Crate Self Modulation	1.00	1.00	2.00	1.72	2.00	3.00	0 (0.00)
Crate Stress	1.00	1.75	2.00	1.97	2.00	4.00	0 (0.00)
Petting Handler Stimulus	1.00	1.00	1.00	1.14	1.00	3.00	1 (0.02)
Petting Handler Holding dog	1.00	1.00	1.00	1.10	1.00	3.00	1 (0.02)
Petting Confidence During	1.00	3.00	3.00	3.19	4.00	5.00	1 (0.02)
Petting Responsiveness After	1.00	3.00	4.00	3.51	4.00	5.00	1 (0.02)
Isolation Response Time oriented	1.00	3.00	4.00	4.00	5.00	5.00	0 (0.00)
Isolation Response Exploration	1.00	1.00	2.00	2.02	3.00	5.00	0 (0.00)
Isolation Response Unsettled Pacing	1.00	1.00	1.50	1.70	2.00	4.00	0 (0.00)
Isolation Response Whining	1.00	1.00	1.00	1.69	2.00	4.00	8 (0.13)
Isolation Response Barking	1.00	1.00	1.00	1.29	1.00	4.00	1 (0.02)
Isolation Reunion	1.00	4.00	4.00	4.08	4.00	6.00	0 (0.00)
Noise Confidence	3.00	4.00	4.00	3.97	4.00	6.00	0 (0.00)
S Familiarisation Handler_mean	1.00	1.00	1.50	1.85	2.00	5.00	1 (0.02)
S Familiarisation Handler_prod	1.00	1.00	2.00	3.72	4.00	25.00	0 (0.00)
S Walking Pull_mean	1.00	1.00	1.75	1.65	2.00	3.50	0 (0.00)
S Walking Pull_prod	1.00	1.00	3.00	3.12	4.00	12.00	0 (0.00)
S Distractions Pull_mean	1.00	2.00	3.00	2.88	3.50	4.50	0 (0.00)
S Distractions Pull_prod	1.00	4.00	8.00	8.78	12.00	20.00	0 (0.00)
S Walking Distractions Pull_mean	-0.50	0.88	1.00	1.23	2.00	3.00	0 (0.00)
S Walking Distractions Pull_prod	-2.00	2.75	5.00	5.67	8.00	18.00	0 (0.00)
S Obedience_mean	1.33	2.33	3.00	2.88	3.33	4.00	0 (0.00)
S Obedience_prod	2.00	9.00	21.00	24.37	36.00	64.00	0 (0.00)
S Sensitivity_mean	1.50	3.00	3.50	3.23	3.50	4.00	0 (0.00)
S Tea Towel First Response	0.00	1.00	1.67	1.64	2.50	3.50	0 (0.00)
S Tea Towel Second Response	0.00	0.00	1.00	1.21	2.00	3.50	0 (0.00)
S Distractions First Response_mean	1.75	2.75	3.25	3.30	3.75	5.75	0 (0.00)
S Distractions First Response_prod	6.00	48.00	93.00	141.05	153.00	1080.00	0 (0.00)
S Distractions Second Response_mean	1.25	2.25	2.75	2.72	3.00	5.75	0 (0.00)
S Distractions Second Response_prod	2.00	16.00	44.00	79.72	72.00	1080.00	0 (0.00)
S Distractions Difference_mean	-2.50	-1.00	-0.50	-0.58	0.00	0.75	0 (0.00)
S Kong Response_mean	1.75	2.25	2.50	2.59	2.75	4.50	0 (0.00)
S Kong Response_prod	2.00	24.00	24.00	43.87	48.00	400.00	0 (0.00)
S Dog Distraction_mean	1.00	2.50	3.00	3.37	4.00	6.00	0 (0.00)
S Dog Distraction_prod	1.00	4.00	5.00	8.23	12.00	28.00	0 (0.00)
S Call Response_mean	1.00	1.00	1.00	1.38	1.50	3.00	1 (0.02)
S Call Response_prod	1.00	1.00	1.00	1.83	2.00	8.00	0 (0.00)
S Familiarisation Dog Call	-3.00	-1.00	0.00	-0.51	0.00	1.00	11 (0.18)
S Crate Response_mean	0.75	1.25	1.75	1.83	2.25	3.25	0 (0.00)
S Crate Response_prod	0.00	2.00	8.00	15.32	16.00	108.00	0 (0.00)
S Crate Stimulus_mean	1.00	1.25	1.50	1.50	1.75	3.00	0 (0.00)
S Crate Stimulus_prod	1.00	2.00	3.00	5.27	4.00	72.00	0 (0.00)
S Crate Handler_mean	1.00	1.00	1.00	1.54	2.00	3.67	0 (0.00)
S Crate Handler_prod	1.00	1.00	1.00	5.42	6.00	45.00	0 (0.00)
S Petting Stimulus During_mean	1.00	2.00	2.00	2.16	2.50	4.00	1 (0.02)
S Petting Stimulus During_prod	1.00	3.00	3.00	3.73	4.00	15.00	0 (0.00)
S Petting Engagement During_mean	1.00	2.00	2.00	2.14	2.50	3.00	1 (0.02)

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Table C.1 - continued from previous page.

Variable	Min	Q_1	Median	Mean	Q_3	Max	NAs (%)
S Petting Engagement During_prod	1.00	3.00	3.00	3.42	4.00	9.00	0 (0.00)
S Petting After_mean	1.00	2.00	2.50	2.31	2.50	3.50	1 (0.02)
S Petting After_prod	1.00	3.00	4.00	3.80	4.00	12.00	0 (0.00)
S Isolation Handler_mean	1.00	2.00	2.33	2.39	2.67	4.00	0 (0.00)
S Isolation Handler_prod	1.00	4.00	5.00	9.95	8.50	64.00	0 (0.00)
S Isolation Stimulus	-2.00	-0.25	0.00	0.32	1.00	4.00	0 (0.00)
S Sociability_mean	1.00	3.33	3.67	3.61	4.00	5.00	0 (0.00)
S Sociability_prod	1.00	32.00	48.00	48.03	60.00	120.00	0 (0.00)

Table C.2: Descriptive statistics for categorical variables of the ADTB ethogram at DC2, including the number of No, Yes and missing data.

Variable	No	Yes	NAs (%)
Body check General Mouths	60	60	0 (0.00)
Body check General Licks	56	4	0 (0.00)
Tea Towel First Response Indifferent	52	8	0 (0.00)
Tea Towel First Response Change from Neutral	9	51	0 (0.00)
Tea Towel First Response Turns head	12	48	0 (0.00)
Tea Towel First Response Attempts to Removes towel by moving	33	27	0 (0.00)
Tea Towel First Response Attempts to Removes towel with mouth	33	27	0 (0.00)
Tea Towel First Response Plays	52	8	0 (0.00)
Tea Towel Second Response Indifferent	38	22	0 (0.00)
Tea Towel Second Response Turns head	28	32	0 (0.00)
Tea Towel Second Response Change from Neutral	21	39	0 (0.00)
Tea Towel Second Response Attempts to Removes towel by moving	40	20	0 (0.00)
Tea Towel Second Response Attempts to Removes towel with mouth	40	20	0 (0.00)
Tea Towel Second Response Plays	53	7	0 (0.00)
Crate Urinating	60	60	0 (0.00)
Isolation Urinating	59	1	0 (0.00)

Table C.3: Descriptive statistics for the variable Kong Interaction Lateralisation of the ADTB ethogram at DC2, including the number of dogs in the sample per category.

Variable	None	Both	Right	Left
Kong - Interaction Lateralisation	20	12	11	16

C.2. Feature Selection

Multiple models were built using each ethogram variable individually to predict the probability of withdrawal from training. The results from the univariate logistic regression models are shown in Tables B.4, B.5 and B.6. It includes the model estimate, p-value, Odds Ratio, and the lower 2.5% and upper 97.5% bounds of the Confidence Interval (CI). Positive estimates indicate that the variable was positively associated with a higher probability of withdrawal. Negative estimates suggest that the variable was negatively associated with a higher probability of withdrawal. The p-value shows the level of significance of this relationship.

Table C.4: ADTB univariate logistic regression model estimates, p-value, Odds Ratio (OR), and Confidence Interval (CI).

Variable	Estimate	p-value	OR	2.5 %	97.5 %
Familiarisation Response Oriented to Handler	-0.48	0.15	0.62	0.29	1.12
Familiarisation Response Exploration	0.15	0.67	1.16	0.63	2.69
Familiarisation Response Waiting	-1.43	0.17	0.24	0.01	1.01
Call Back Response	-0.85	0.45	0.43	0.02	2.81
Walking Distractibility	0.03	0.93	1.03	0.45	2.31
Walking Pull on leash ***	-1.44	0.03	0.24	0.05	0.71
Walking Pull strength ***	-1.90	0.02	0.15	0.02	0.62
Walking Initiative	0.42	0.31	1.53	0.67	3.54
Standing Response	0.50	0.16	1.65	0.85	3.55
Sitting Response	-0.14	0.63	0.87	0.48	1.57
Lying Response	-0.25	0.34	0.78	0.47	1.31
Lying Settled	-0.04	0.91	0.97	0.54	1.76
Body check Table *	-0.42	0.14	0.66	0.37	1.17
Body check Response	-0.45	0.36	0.64	0.23	1.73
Distractions First Response Teddy	-0.14	0.59	0.87	0.51	1.41
Distractions First Response Human	0.19	0.61	1.21	0.59	2.56
Distractions First Response Car ***	0.79	0.02	2.21	1.18	4.71
Distractions First Response Food	0.18	0.46	1.19	0.76	1.98
Distractions Second Response Teddy	-0.04	0.87	0.96	0.53	1.59
Distractions Second Response Human	-0.19	0.61	0.82	0.38	1.70
Distractions Second Response Car	0.39	0.19	1.47	0.82	2.69
Distractions Second Response Food	0.21	0.40	1.24	0.74	2.08
Distractions Pull on leash	0.04	0.93	1.04	0.44	2.39
Distractions Human	0.03	0.94	1.03	0.48	2.19
Kong Presentation Response	-0.15	0.59	0.86	0.51	1.48
Kong Interaction Response to stimulus ***	2.16	0.03	8.63	1.31	73.31
Kong Interaction Response to handler	0.03	0.94	1.03	0.46	2.15
Kong Interaction Back	0.37	0.25	1.44	0.74	2.74
Kong Return Handler **	1.27	0.06	3.58	0.96	17.30
Dog Response	0.03	0.89	1.03	0.65	1.65
Dog Call Back Response	0.35	0.34	1.42	0.67	2.93
Crate Entering	-0.26	0.71	0.77	0.13	2.51
Crate Settled	-0.00	1.00	1.00	0.57	1.77
Crate Sniffing Exploring	0.28	0.43	1.33	0.65	2.73
Crate Actively Seeking Attention **	-0.87	0.08	0.42	0.12	0.92
Crate Digging	0.54	0.39	1.71	0.42	5.91
Crate Whining	-0.81	0.12	0.45	0.12	1.03
Crate Barking	-15.72	0.99	0.00		
Crate Self Modulation	-0.12	0.79	0.89	0.35	2.09
Crate Nudging Crate	-1.02	0.31	0.36	0.02	1.71
Crate Pawing	-15.61	0.99	0.00		
Crate Stress	-0.13	0.78	0.88	0.34	2.15
Petting Handler Stimulus	-0.53	0.61	0.59	0.03	3.04
Petting Handler Holding dog	-0.16	0.86	0.86	0.06	3.62
Petting Confidence During	-0.34	0.39	0.71	0.31	1.53
Petting Responsiveness After	0.38	0.31	1.47	0.72	3.19
Isolation Response Time oriented ***	-0.71	0.03	0.49	0.24	0.92
Isolation Response Exploration ***	0.60	0.05	1.83	1.02	3.45
Isolation Response Unsettled Pacing	-0.40	0.36	0.67	0.25	1.47
Isolation Response Whining	-0.41	0.35	0.66	0.24	1.42
Isolation Response Barking	-0.65	0.37	0.52	0.04	1.41
Isolation Reunion	-0.28	0.45	0.76	0.37	1.60
Noise Confidence	-0.32	0.49	0.73	0.27	1.70

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Table C.4 - continued from previous page.

Variable	Estimate	p-value	OR	2.5 %	97.5 %
S Familiarisation Handler_mean	-0.96	0.10	0.38	0.10	1.01
S Familiarisation Handler_prod	-0.35	0.15	0.70	0.39	0.99
S Walking Pull_mean ***	-1.72	0.02	0.18	0.03	0.63
S Walking Pull_prod ***	-0.57	0.02	0.56	0.31	0.86
S Distractions Pull_mean	-0.07	0.86	0.94	0.45	1.93
S Distractions Pull_prod	0.01	0.92	1.01	0.88	1.14
S Walking Distractions Pull_mean **	0.78	0.06	2.19	0.98	5.34
S Walking Distractions Pull_prod	0.10	0.16	1.10	0.96	1.27
S Obedience_mean	-0.06	0.90	0.94	0.36	2.54
S Obedience_prod	-0.00	0.99	1.00	0.96	1.04
S Sensitivity_mean **	-0.86	0.09	0.42	0.15	1.14
S Tea Towel First Response	-0.05	0.88	0.95	0.49	1.81
S Tea Towel Second Response	0.03	0.92	1.03	0.57	1.79
S Distractions First Response_mean	0.46	0.26	1.59	0.70	3.64
S Distractions First Response_prod	0.00	0.81	1.00	1.00	1.00
S Distractions Second Response_mean	0.22	0.57	1.24	0.55	2.65
S Distractions Second Response_prod	-0.00	0.99	1.00	0.99	1.00
S Distractions Difference_mean	-0.27	0.55	0.76	0.31	1.90
S Kong Response_mean	0.53	0.38	1.70	0.49	5.66
S Kong Response_prod	0.01	0.15	1.01	1.00	1.02
S Dog Distraction_mean	0.01	0.98	1.01	0.55	1.78
S Dog Distraction_prod	0.03	0.61	1.03	0.92	1.14
S Call Response_mean	0.39	0.54	1.48	0.39	5.06
S Call Response_prod	0.06	0.81	1.06	0.61	1.61
S Familiarisation Dog Call	-0.38	0.30	0.68	0.32	1.40
S Crate Response_mean	-0.12	0.82	0.88	0.30	2.44
S Crate Response_prod	-0.02	0.40	0.98	0.92	1.01
S Crate Stimulus_mean	-0.15	0.87	0.86	0.13	4.26
S Crate Stimulus_prod	-0.03	0.61	0.97	0.79	1.04
S Crate Handler_mean *	-1.25	0.09	0.29	0.04	0.92
S Crate Handler_prod	-0.22	0.14	0.80	0.53	0.98
S Petting Stimulus During_mean	-0.57	0.39	0.57	0.13	1.90
S Petting Stimulus During_prod	-0.15	0.43	0.86	0.52	1.16
S Petting Engagement During_mean	-0.69	0.36	0.50	0.11	2.19
S Petting Engagement During_prod	-0.14	0.62	0.87	0.48	1.42
S Petting After_mean	0.60	0.38	1.82	0.49	7.33
S Petting After_prod	0.11	0.52	1.12	0.76	1.58
S Isolation Handler_mean ***	-1.23	0.04	0.29	0.08	0.87
S Isolation Handler_prod	-0.04	0.35	0.96	0.86	1.02
S Isolation Stimulus ***	0.60	0.03	1.83	1.10	3.25
S Sociability_mean	-0.14	0.76	0.87	0.35	2.20
S Sociability_prod	-0.01	0.61	0.99	0.97	1.02
Body check General Licks	0.31	0.80	1.36	0.06	11.88
Tea Towel First Response Indifferent	-17.36	0.99	0.00		
Tea Towel First Response Change from Neutral	17.39	0.99	35584245.59	0.00	
Tea Towel First Response Turns head	1.18	0.28	3.27	0.54	63.12
Tea Towel First Response Attempts to Removes towel by moving	-0.17	0.80	0.84	0.22	3.02
Tea Towel First Response Attempts to Removes towel with mouth	-0.61	0.37	0.54	0.13	1.97
Tea Towel First Response Plays	-0.63	0.57	0.53	0.03	3.47
Tea Towel Second Response Indifferent ***	-2.15	0.05	0.12	0.01	0.67
Tea Towel Second Response Turns head	0.69	0.31	2.00	0.55	8.33
Tea Towel Second Response Change from Neutral **	2.06	0.06	7.86	1.36	149.47
Tea Towel Second Response Attempts to Removes towel by moving	-0.00	1.00	1.00	0.24	3.70
Tea Towel Second Response Attempts to Removes towel with mouth	-1.10	0.19	0.33	0.05	1.45
Tea Towel Second Response Plays	-0.45	0.69	0.64	0.03	4.29

Continued on next page.

Table C.4 - continued from previous page.

Variable	Estimate	p-value	OR	2.5 %	97.5 %
Sex	1.03	0.13	2.80	0.77	11.70

95% CI: lower 2.5% and upper 97.5%. Statistically significant with $p < 0.05$ (***), $p < 0.10$ (**), $p < 0.15$ (*).

Table C.5: Univariate logistic regression model using the demographic variable Breed as a predictor of the probability of withdrawal, including estimates, p-value, Odds Ratio (OR) and Confidence Interval (CI).

Variable	Estimate	P-value
(Intercept)	16.57	0.99
LR	-17.95	0.99
LRxGR	-18.11	0.99

Table C.6: Univariate logistic regression model using the variable Kong Interaction Lateralisation as a predictor of the probability of withdrawal. Model parameters reported include estimates, p-value, Odds Ratio (OR) and Confidence Interval (CI).

Variable	Estimate	P-value	OR	2.5 %	97.5 %
(Intercept)	0.34	0.57	1.40	0.45	4.73
Left	1.20	0.16	3.33	0.63	20.46
None	1.86	0.05	6.43	1.11	52.98
Right	1.97	0.10	7.14	0.89	153.54

Figure C.1: Correlation matrix for the numerical variables in Step 3 of feature selection.

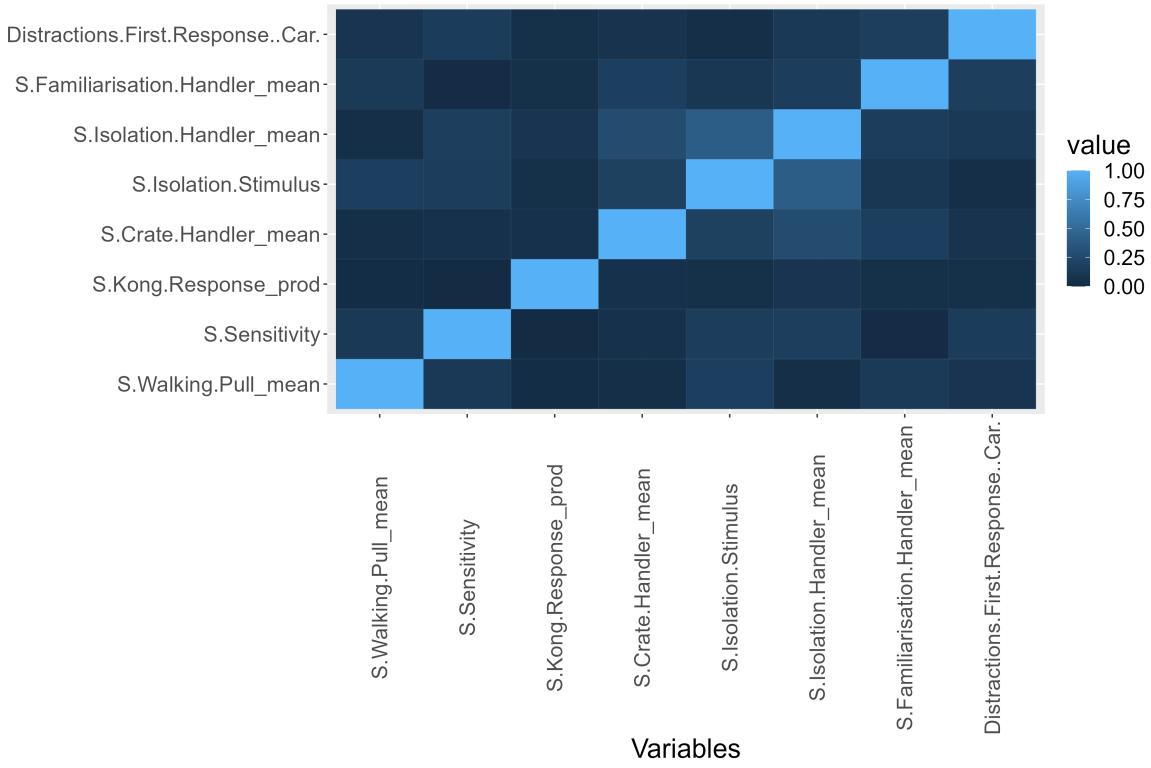


Table C.7
Variables that satisfied the three-step feature selection strategy in DC2.

Variable	Step 1	Step 2	Step 3	RFE
S Familiarisation Handler_mean	Yes	Yes	Yes	Yes
S Familiarisation Handler_prod	Yes	No	-	-
S Walking Pull_mean	Yes	Yes	Yes	Yes
S Walking Pull_prod	Yes	No	-	-
S Walking Distractions Pull_mean	Yes	No	-	-
Walking Pull on leash	Yes	No	-	-
Walking Pull strength	Yes	No	-	-
S Sensitivity_mean	Yes	Yes	Yes	Yes
Body check Table	Yes	No	-	-
Tea Towel Second Response Indifferent	Yes	Yes	Yes	No
Tea Towel Second Response Change from Neutral	Yes	Yes	No	-
Distractions First Response Car	Yes	Yes	Yes	Yes
S Kong Response_prod	Yes	Yes	Yes	No
Kong Interaction Response to stimulus	Yes	No	-	-
Kong Return Handler	Yes	No	-	-
S Crate Handler_mean	Yes	Yes	Yes	Yes
S Crate Handler_prod	Yes	No	-	-
Crate Actively Seeking Attention	Yes	No	-	-
Crate Whining	Yes	No	-	-
S Isolation Handler_mean	Yes	Yes	Yes	No
Isolation Response Time oriented	Yes	No	-	-
S Isolation Stimulus	Yes	Yes	Yes	Yes
Isolation Response Exploration	Yes	No	-	-

C.3. Optimal Model

For ease of reference, Table C.8 combines key information from both the original ethogram items used to calculate the composite scores as shown in Table A.2 and the ethogram item in Table A.1. Table C.9 shows the results of the feature importance analysis of the optimal multivariate logistic regression model.

Table C.8: Composite scores, original ethogram items, and their respective marking for the variables chosen for the optimal model built on the DC2 dataset.

Subtest	Items	Marking
S Familiarisation Handler_mean		
1. Familiarisation	Oriented to Handler; Waiting	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly

Continued on next page.

Table C.8 - continued from previous page.

Subtest	Items	Marking
S Walking Pull_mean		
2. Walking	Pull on leash	1 - Not observed (0) ; 2 - Rare (1-2); 3 - Sometimes (3-5); 4 - Frequent (6-8)
	Pull strength	1 - No tension, lead relaxed; 2 - Mild tension; 3 - Moderate tension; 4 - Strong tension; 5 - Extreme tension, back legs stretched, and on or more front paws raised off the floor
S Sensitivity_mean		
6. Body check	Table	1 - Refuse 2 - Hesitant 3 - Cooperative 4 - Willing
	Response	1 - Escaping/Not willing 2 - Reluctant 3 - Cooperative 4 - Willing
S Crate Handler_mean		
11. Crate	Actively Seeking Attention; Whining; Barking	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly
S Isolation Stimulus		
13. Isolation	Exploration; Unsettled/Pacing	1 - Never; 2 - Rarely; 3 - Occasionally; 4 - Regularly; 5 - Constantly

Table C.9: Importance of features in the optimal model built on the DC2 dataset.

Variable	Importance
Distractions First Response Car	2.27
S Walking Pull_mean	2.30
S Familiarisation Handler_mean	1.76
S Isolation Stimulus	1.19
1 S Crate Handler_mean	1.13
S Sensitivity_mean	1.10

C.4. Visualisation

Figures C.2 to C.10 show the variables selected for the reduced dataset created with DC2 data. These variables were rated following the scales presented in Table A.1.

Figure C.2: Bar chart and box plot of the distribution of the ADTB item "Tea Towel Second Response Indifferent" at DC2 in relation to working outcomes.

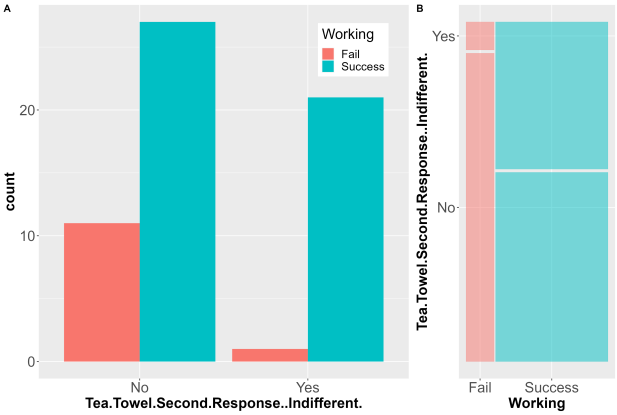


Figure C.3: Bar chart and box plot of the distribution of the ADTB item "Distractions First Response Car" at DC2 in relation to working outcomes.



Figure C.4: Bar chart and box plot of the distribution of the ADTB score "S Walking Pull_mean" at DC2 in relation to working outcomes.

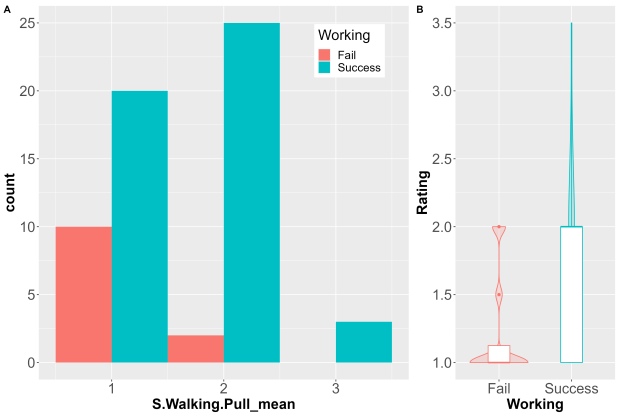


Figure C.5: Bar chart and box plot of the distribution of the ADTB score"S Sensitivity" at DC2 in relation to working outcomes.

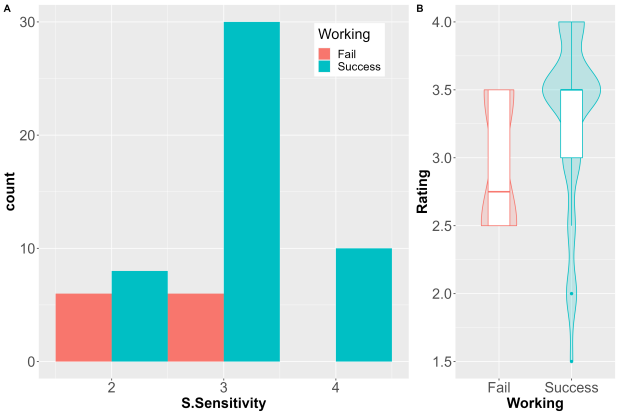


Figure C.6: Bar chart and box plot of the distribution of the ADTB score "S Kong Response_prod" at DC2 in relation to working outcomes.

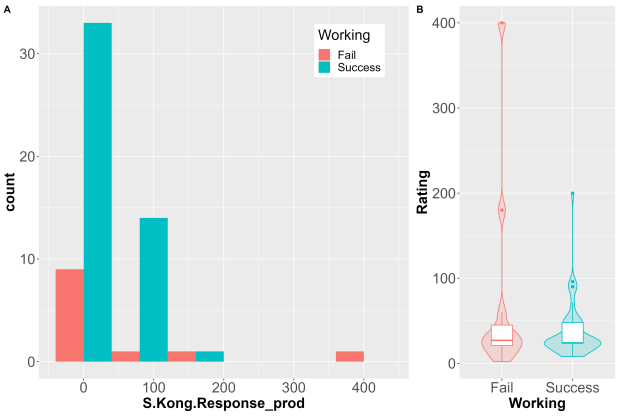


Figure C.7: Bar chart and box plot of the distribution of the ADTB score "S Crate Handler_mean" at DC2 in relation to working outcomes.

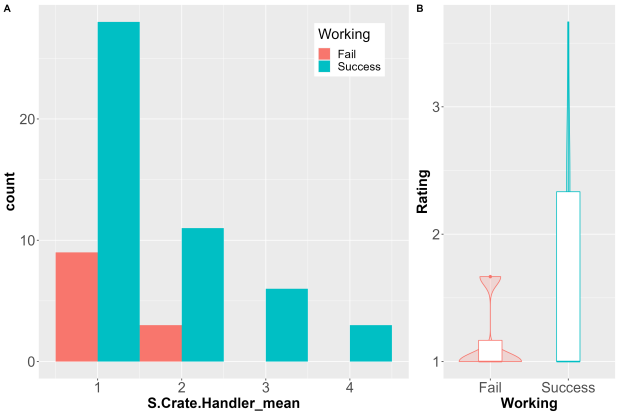


Figure C.8: Bar chart and box plot of the distribution of the ADTB score "S Isolation Stimulus" at DC2 in relation to working outcomes.

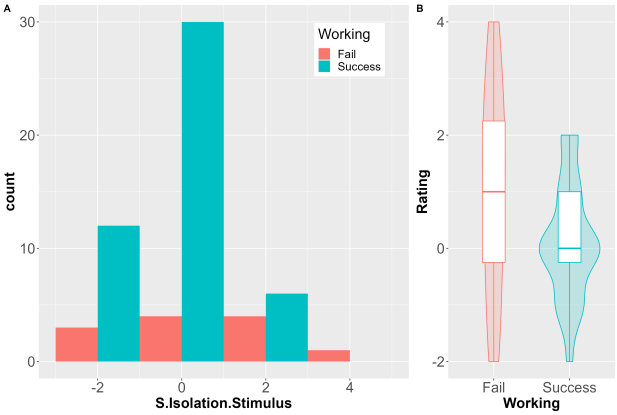


Figure C.9: Bar chart and box plot of the distribution of the ADTB score "S Isolation Handler_mean" at DC2 in relation to working outcomes.

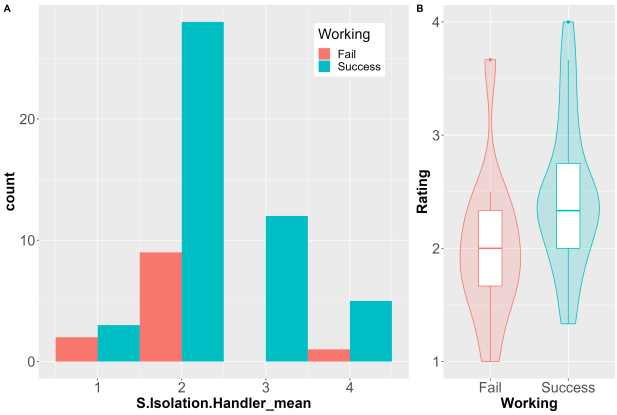


Figure C.10: Bar chart and box plot of the distribution of the ADTB score "S Familiarisation Handler_mean" at DC2 in relation to working outcomes.

