

General

Table S1. Distribution of 30-s video clips across subject, sex, age class, and housing condition

| Subject | Sex | Age class | Old enclosure | New enclosure |
|----------------|------------|------------------|----------------------|----------------------|
| Animal 1 | Female | Adult | 15 | 13 |
| Animal 2 | Female | Adult | 10 | 13 |
| Animal 3 | Female | Adult | 12 | 19 |
| Animal 4 | Female | Adult | 17 | 28 |
| Animal 5 | Female | Adult | 8 | 14 |
| Animal 6 | Male | Adult | 11 | 16 |
| Animal 7 | Male | Adult | 7 | 14 |
| Animal 8 | Male | Adult | 5 | 14 |
| Animal 9 | Male | Subadult | 16 | 21 |
| Animal 10 | Male | Subadult | 10 | 15 |

Table S2. Demographics of human participants in Study 1 and Study 2

| | Study 1 | | Study 2 | |
|--|----------------|-------|----------------|-------|
| Experience | | | | |
| Student | 17 | 65.4% | 38* | 88.4% |
| Expert | 9 | 34.6% | 5 | 11.6% |
| Pet ownership | | | | |
| Yes, present | 23 | 88.5% | 39 | 90.7% |
| Yes, past | 3 | 11.5% | 4 | 9.3% |
| No | 0 | 0.0% | 0 | 0.0% |
| Zoo visits | | | | |
| 0 visits/year | 6 | 23.1% | 13 | 30.2% |
| 1–5 visits/year | 12 | 46.2% | 24 | 55.8% |
| 6–10 visits/year | 2 | 7.7% | 1 | 2.3% |
| +10 visits/year | 6 | 23.1% | 5 | 11.6% |
| Work experience (only students) | | | | |
| Yes, present | 12 | 70.6% | 28 | 73.7% |
| With primates | 1 | 5.9% | 2 | 5.3% |
| Yes, past | 4 | 23.5% | 6 | 15.8% |
| With primates | 0 | 0.0% | 0 | 0.0% |
| No | 0 | 0.0% | 2 | 5.3% |

* Six students did not fully complete the survey and were not included here

Table S3. Clustering of Animal Empathy statements based on Ward Hierarchical Clustering analysis

Cluster 1 – ‘Empathic’

5. Sad films about animals often leave me with a lump in my throat.
 7. It makes me sad to see an animal on its own in a cage.
 9. A friendly purring cat almost always cheers me up.
 10. It upsets me when I see helpless old animals.
 13. I get very angry when I see animals being ill-treated.
 15. Pets have a great influence on my moods.
 17. I enjoy feeding scraps of food to the birds.
 18. Seeing animals in pain upsets me.
 21. I would always try to help if I saw a dog or puppy that seemed to be lost.
 22. I hate to see birds in cages where there is no room for them to fly about.
 23. It upsets me to see farm animals in lorries going to slaughter.
 26. The thought of calves being reared in veal crates really makes me feel sad.
 27. I hate seeing pictures of animals used in scientific experiments.
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Cluster 2 – ‘Apathic’

1. So long as they’re warm and well fed, I don’t think zoo animals mind being kept in cages.
 2. Often cats will meow and pester for food even when they are not really hungry.
 3. It upsets me to see animals being chased and killed by lions in wildlife programmes on TV.
 4. I get annoyed by dogs that howl and bark when they are left alone.
 6. Animals deserve to be told off when they’re not behaving properly.
 8. People who cuddle and kiss their pets in public annoy me.
 11. Dogs sometimes whine and whimper for no real reason.
 12. Many people are over-affectionate towards their pets.
 14. It is silly to become too attached to one’s pets.
 16. Sometimes I am amazed how upset people get when an old pet dies.
 19. People often make too much of the feelings and sensitivities of animals.
 20. I find it irritating when dogs try to greet me by jumping up and licking me.
 24. It’s silly to worry about how farm animals feel.
 25. People are too concerned about the suffering of laboratory rats and mice.
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Study 1: Free Choice Profiling

Table S4. Descriptions of the videos used in Study 1, Phase 1 of the Free Choice Profiling procedure

| Video | Short description |
|--------------|---|
| 01 | Bonobo resting |
| 02 | Bonobo autogrooming |
| 03 | Bonobos A and B vocalising, C charging and hitting glass towards the visitors and scratching |
| 04 | Bonobo performing solitary play |
| 05 | Bonobo mother interacting with infant |
| 06 | Bonobo A approaches B and C and starts displaying |
| 07 | Bonobo swinging through flexible structures |
| 08 | Bonobos A and B engaging in genito-genital rubbing, C harasses |
| 09 | Allogrooming among four bonobos |
| 10 | Bonobo hit on glass, then starts feeding on browse |
| 11 | Bonobo A grooms B, B embraces A, B leaves and reaches for C |
| 12 | Genito-genital rubbing between bonobo A and B, C harasses A, and A and C perform parallel display. D undirected display, and E and F perform short charge |
| 13 | Bonobo tries to open a coconut and succeeds |
| 14 | Bonobo A follows B, B displaces |
| 15 | Four bonobos gentle playing |
| 16 | Two bonobos playing with object |
| 17 | Bonobo looking through door to other group, sticking fingers through holes |
| 18 | Bonobo sits, then moves and rough scratches |
| 19 | Bonobo A sits, then vocalises and short charge to B |
| 20 | Bonobo A grooming B, A pushes away C. Bonobo D is resting and eating |

The order of the videos in this table is as presented to the observer with the intention to create contrast between the content of the videos to stimulate observers to think of different terms.

Table S5. Unique descriptors used in Study 1 Phase 1 in Dutch and their English translation

| | Dutch term | English term | | Dutch term | English term |
|----|-------------------|---------------------|----|-------------------|----------------------|
| 1 | Aandacht zoekend | Attention-seeking | 45 | Geamuseerd | Amused |
| 2 | Aandachtig | Attentive | 46 | Geconcentreerd | Concentrated |
| 3 | Aanstellend | Petty | 47 | Gedreven | Driven |
| 4 | Actief | Active | 48 | Geërgerd | Annoyed |
| 5 | Affectief | Affectionate | 49 | Gefocust | Focused |
| 6 | Afgeleid | Distracted | 50 | Gefrustreerd | Frustrated |
| 7 | Afwachtend | Waiting | 51 | Geïnteresseerd | Interested |
| 8 | Afwerend | Rejecting | 52 | Geïntimideerd | Intimidated |
| 9 | Afwezig | Absent | 53 | Geïrriteerd | Irritated |
| 10 | Agressief | Aggressive | 54 | Gelaten | Relieved |
| 11 | Alert | Alert | 55 | Geliefd | Loved |
| 12 | Angstig | Anxious | 56 | Gemak | Comfortable |
| 13 | Antisociaal | Anti-social | 57 | Genietend | Enjoying |
| 14 | Apathisch | Apathetic | 58 | Gepassioneerd | Passionate |
| 15 | Avontuurlijk | Adventurous | 59 | Gerust | At Ease |
| 16 | Baldadig | Reckless | 60 | Geschokt | Shocked |
| 17 | Bang | Afraid | 61 | Geschrokken | Scared |
| 18 | Bazig | Bossy | 62 | Gespannen | Tense |
| 19 | Bedachtzaam | Pensive | 63 | Gestimuleerd | Stimulated |
| 20 | Bedreigd | Threatened | 64 | Gestoord | Disturbed |
| 21 | Behoeftig | Needy | 65 | Gestrest | Stressed |
| 22 | Behulpzaam | Helpful | 66 | Gewijzigd | Altered |
| 23 | Beschermend | Protective | 67 | Goedgezind | In good spirits |
| 24 | Besluiteloos | Undecided | 68 | Grenzen aftastend | Exploring Boundaries |
| 25 | Beweeglijk | Mobile | 69 | Hardhandig | Heavy Handed |
| 26 | Bezitterig | Possessive | 70 | Hebberig | Greedy |
| 27 | Bezorgd | Concerned | 71 | Helpend | Helping |
| 28 | Boos | Angry | 72 | Hevig | Fierce |
| 29 | Buitengesloten | Excluded | 73 | Hongerig | Hungry |
| 30 | Content | Content | 74 | Impulsief | Impulsive |
| 31 | Defensief | Defensive | 75 | In aandacht nood | In Need Of Attention |
| 32 | Dominant | Dominant | 76 | Intens | Intense |
| 33 | Doorzettend | Persistent | 77 | Irritant | Annoying |
| 34 | Dreigend | Threatening | 78 | Jaloers | Jealous |
| 35 | Druk | Busy | 79 | Jeukend | Itchy |
| 36 | Dwang | Compulsive | 80 | Kalm | Calm |
| 37 | Dwingend | Coercive | 81 | Knuffelig | Cuddly |
| 38 | Eenzaam | Lonely | 82 | Kordaat | Resolute |
| 39 | Eetlustig | Appetitive | 83 | Lastig | Difficult |
| 40 | Energierijk | Energetic | 84 | Levendig | Lively |
| 41 | Enthousiast | Enthusiastic | 85 | Lief | Sweet |
| 42 | Exploratief | Explorative | 86 | Liefhebbend | Loving |
| 43 | Explosief | Explosive | 87 | Loops | In Heat |
| 44 | Geagiteerd | Agitated | 88 | Lui | Lazy |

Table S5. continued

| | Dutch term | English term | | Dutch term | English term |
|-----|----------------------|---------------------|-----|-------------------|---------------------|
| 89 | Luid | Loud | 132 | Slaperig | Drowsy |
| 90 | Luidruchtig | Noisy | 133 | Sociaal | Social |
| 91 | Lustig | Lustful | 134 | Speels | Playful |
| 92 | Moe | Tired | 135 | Suf | Dull |
| 93 | Nerveus | Nervous | 136 | Terughoudend | Reluctant |
| 94 | Niet onder de indruk | Unimpressed | 137 | Terugtrekkend | Withdrawn |
| 95 | Nieuwsgierig | Curious | 138 | Timide | Timid |
| 96 | Nood aan vrijheid | In need of freedom | 139 | Toegankelijk | Accessible |
| 97 | Observerend | Observant | 140 | Toegeeflijk | Permissive |
| 98 | Obsessief | Obsessive | 141 | Traag | Slow |
| 99 | Oncomfortabel | Uncomfortable | 142 | Treurig | Sad |
| 100 | Onderdanig | Submissive | 143 | Troostend | Comforting |
| 101 | Onderzoekend | Inquisitive | 144 | Trots | Proud |
| 102 | Ongeduldig | Impatient | 145 | Trouw | Loyal |
| 103 | Ongeïnteresseerd | Uninterested | 146 | Uitdagend | Challenging |
| 104 | Ongelukkig | Unhappy | 147 | Van streek | Upset |
| 105 | Ongemakkelijk | Uneasy | 148 | Vastberaden | Determined |
| 106 | Ongerust | Worried | 149 | Verbaasd | Surprised |
| 107 | Onhandig | Clumsy | 150 | Verkennend | Exploring |
| 108 | Onoplettend | Inattentive | 151 | Verlegen | Shy |
| 109 | Ontdekkend | Discovering | 152 | Vermijdend | Avoidant |
| 110 | Ontevreden | Dissatisfied | 153 | Verveeld | Bored |
| 111 | Ontspannen | Relaxed | 154 | Verwachtingsvol | Expectant |
| 112 | Ontwijkend | Evasive | 155 | Verward | Confused |
| 113 | Onverstoord | Undisturbed | 156 | Verzorgend | Nurturing |
| 114 | Onwetend | Ignorant | 157 | Vijandig | Hostile |
| 115 | Onzeker | Insecure | 158 | Voldaan | Satisfied |
| 116 | Opdringerig | Pushy | 159 | Voorzichtig | Careful |
| 117 | Opeisend | Demanding | 160 | Vreesachtig | Fearful |
| 118 | Opgejaagd | Hunted | 161 | Vriendelijk | Friendly |
| 119 | Opgewekt | Cheerful | 162 | Vrolijk | Happy |
| 120 | Opgewonden | Excited | 163 | Waakzaam | Vigilant |
| 121 | Oplettend | Watchful | 164 | Waarschuwend | Warning |
| 122 | Paniek | Panicking | 165 | Wantrouwig | Suspicious |
| 123 | Paniekerig | Panicky | 166 | Zeker | Confident |
| 124 | Pesterig | Bullying | 167 | Zelf-kalmerend | Self-Soothing |
| 125 | Plagerig | Teasing | 168 | Zelfzeker | Self-confident |
| 126 | Plezier maken | Having fun | 169 | Zorgeloos | Carefree |
| 127 | Plots | Brusque | 170 | Zorgend | Caring |
| 128 | Prikkelbaar | Irritable | | | |
| 129 | Psychopathisch | Psychopathic | | | |
| 130 | Rusteloos | Restless | | | |
| 131 | Rustig | Quiet | | | |

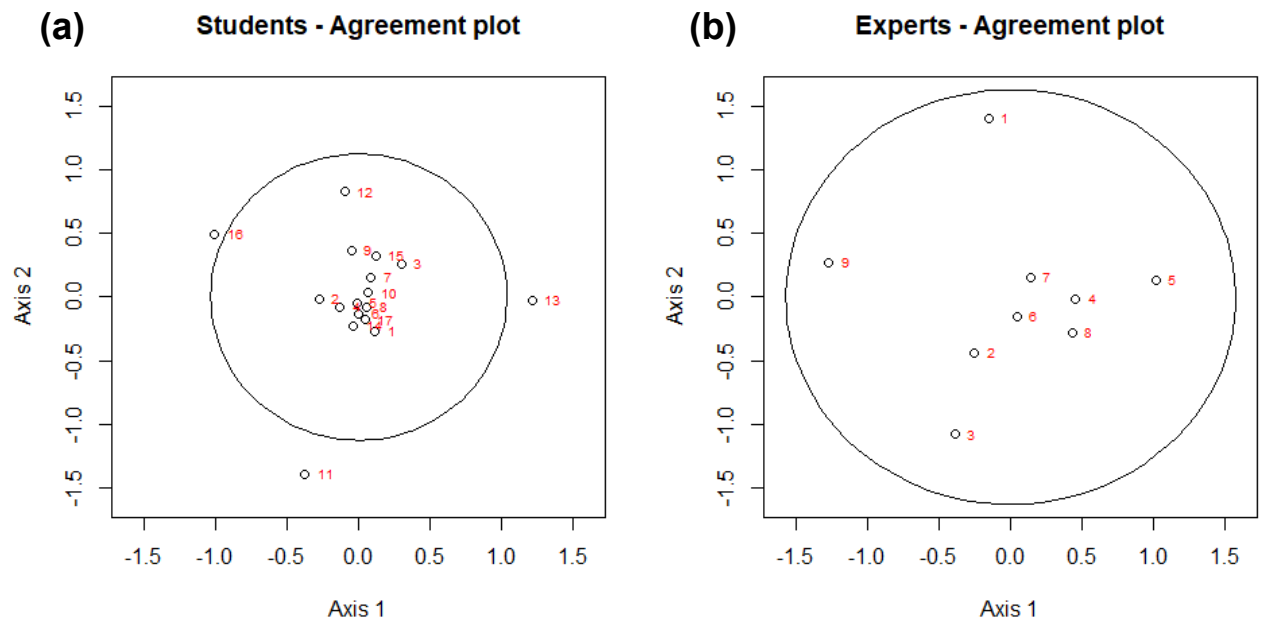


Figure S1. Observer plots for (a) students and (b) experts in Study 1. Numbers represent individual observers and the circle represents the 95% confidence ellipse.

Study 2: Fixed List procedure

Table S6. Kaiser-Meyer-Olkin (KMO) test results for Study 2

| KMO - Student | | KMO - Expert | |
|--------------------|------|--------------------|------|
| Overall | 0.90 | Overall | 0.87 |
| Active | 0.92 | Active | 0.90 |
| Anxious | 0.85 | Anxious | 0.86 |
| Happy | 0.91 | Happy | 0.85 |
| Irritated | 0.87 | Irritated | 0.83 |
| Excited | 0.95 | Excited | 0.94 |
| Quiet | 0.87 | Quiet | 0.88 |
| Frustrated | 0.88 | Frustrated | 0.82 |
| Curious | 0.88 | Curious | 0.84 |
| Self-confident | 0.93 | Self-confident | 0.76 |
| Stressed | 0.90 | Stressed | 0.81 |
| Content | 0.90 | Content | 0.86 |
| Calm | 0.87 | Calm | 0.90 |
| Agitated | 0.94 | Agitated | 0.91 |
| Sad | 0.85 | Sad | 0.85 |
| Focused | 0.83 | Focused | 0.66 |
| Social | 0.94 | Social | 0.87 |
| Indifferent | 0.86 | Indifferent | 0.92 |
| Lethargic | 0.85 | Lethargic | 0.82 |
| Relaxed | 0.93 | Relaxed | 0.91 |
| Lively | 0.93 | Lively | 0.90 |
| Nervous | 0.92 | Nervous | 0.88 |
| Positively engaged | 0.92 | Positively engaged | 0.87 |
| Bored | 0.81 | Bored | 0.90 |
| Playful | 0.90 | Playful | 0.87 |