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Forward thinking
Applying ethology to solve behaviour and welfare questions

ABSTRACT BOOKLET

WP Young Seminar Room, Veterinary Science Conference Centre

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Thank you!

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KEYNOTE PRESENTATION
Fundamental and applied ethology in a major insect pest; what's the difference and does it matter?

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Queensland fruit flies are Australia's most economically damaging insect of horticultural crops. Synthetic insecticides have provided a high level of crop protection for many decades, but most now face severe restrictions owing to concerns about environmental contamination and consumer health. Horticulture industries now have no choice other than to move away from simple insecticidal approaches to more sophisticated programs that require an intimate understanding of the target pest's behaviour. Such approaches are far better for the environment and for human health, and also offer new opportunities and new prominence for associated ethology research. Ethology is now very much part of an increasingly desperate drive toward environmentally benign and publically acceptable pest management practises. The search for new management solutions has driven close scrutiny of what is currently known, and of the extent to which guidance for management practises can be drawn from previous and ongoing fundamental and applied ethology research. I will discuss some key areas of ethology that are relevant to the management of this pest and use examples from this research to illustrate the intimate links between fundamental and applied ethology.

*Phil Taylor leads the Behavioural Biology Research Group at Macquarie University. The group studies terrestrial invertebrates that act as a model from which a variety of as convenient and tractable models for a wide diversity of ultimate (evolutionary) and proximate (mechanistic) questions of why animals behave as they do. Current work focusses on reproductive and nutritional biology of Queensland fruit flies (*Bactrocera tryoni*, *aka 'Q-fly'), flexible predatory strategies of* Stenolemus *assassin bugs and communication, assessment and decision-making of jumping spiders. In addition to addressing questions of basic Behavioural Biology, Phil's research applies the concepts and techniques of Behavioural Biology to current issues of environmentally benign pest management.*

Executive Function in the Domestic Dog

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Executive brain function relies on the prefrontal cortex and includes tasks such as reversal learning and attentional set shifting, when the criterion for a reward is changed from within the same dimension (e.g. colour) to a different dimension (e.g. shape). While attentional set shifting has been recorded in humans, primates, rodents and sheep, no studies have tested attentional set shifting in dogs. Discrimination testing in 7 Labrador retriever dogs were established with a clicker (secondary reinforcer) and food rewards to mark correct choice. The discriminations in consecutive order were 1) simple colour discrimination (SD) 2) reversal of SD (SR) 3) compound discrimination (CD), 2 new colours and 2 different shapes to confirm dogs were choosing based on colour 4) intradimensional set shifting (IDS), 2 new colours and a new shape 5) reversal of the IDS (IDR) 6) extradimensional set shifting (EDS) with the criterion based on shape instead of colour, and 7) reversal of the EDS task (EDR). Sets comprised 8 runs, with video to record latency to respond, and behavioural measures of frustration during the first reversal task. Criterion was 80% correct choices in two consecutive sets. Dogs took 5.7 ± 2.2 sets to learn the simple colour discrimination, and 20.6 ± 1.4, 4.4 ± 1.2, 5.4 ± 1.1, 16.0 ± 1.5, 5.6 ± 1.4 and 9.0 ± 1.6 sets to complete the SR, CD, IDS, IDR, EDS and EDR tasks, respectively (mean$\pm$SD). More frustration related behaviours (e.g. lip licking) were displayed during SR versus SD runs. The testing protocol demonstrated executive functions in dogs, including reversal learning, and cognitive flexibility with changing colour and shape criterion for reward. Attentional set shifting was not demonstrated, however, as the number of sets to criterion in the EDS was not significantly more than for the IDS (5.6 ± 1.4 versus 5.4 ± 1.1). Thus new stimulus-reward pairings were shown, rather than attendance to a previously rewarded cognitive-attentional set.

Suzanne Hallett is completing a BSc(Honours) in Animal Science currently in the School of Animal & Veterinary Sciences, University of Adelaide.

Approval for this study was provided by the University of Adelaide Animal Ethics Committee.

Coding and quantification of a facial expression for pain in lambs: Preliminary studies.

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Recently, there has been interest in developing coding systems for facial expressions of pain in animals. The aim of this study was to identify whether lambs produce noticeable changes in facial expression when experiencing pain. By comparing images of lambs before and after tail-docking, five facial action units (FAUs) were identified: Orbital Tightening, Mouth Features, Nose Features, Cheek Flattening and Ear Posture. In Experiment I, still images of restrained lambs' faces were taken before and after docking or sham docking (n=7). Each of the first four FAUs was scored from 0 (absent) to 2 (obviously present) by 5 observers. In Experiment II, still images were extracted from videos taken before and after docking, both when lambs were restrained and when free in a pen (n=9). All five FAUs were scored by 5 different observers. Changes in each FAU were also quantified using image measurement software. In each experiment, FAUs were averaged to provide an overall Lamb Grimace Scale (LGS) score before analysis. In Experiment 1, observers differentiated between docked and control lambs using the LGS (period x treatment effect: $F=11.23$, $P=0.02$): Scores increased after docking but did not change in control lambs. In Experiment 2, LGS scores increased after docking (period effect: $F=49.39$, $P=0.0001$). Quantitatively, only the right ear posture and mouth angle changed after docking (period effects: $F=6.14$, $P=0.04$, $F=8.58$, $P=0.02$). Restraint also influenced LGS scores, with lambs given higher scores when held than when free in the pen ($F=38.25$, $P=0.0003$). In both experiments, observer had a significant effect on LGS scores. In conclusion, a LGS integrating observers' perceptions of various facial features was useful for identifying lambs that had been tail docked. However, scores varied among observers and restraint influenced LGS scores and quantitative measures. Further research is required to demonstrate a reliable facial expression of pain in lambs.

Mirjam Guesgen has recently submitted her PhD at Massey University, entitled: The social function of pain-related behaviour and novel techniques for assessing pain in lambs, with supervisors Ngaio Beausoleil, Kevin Stafford, Mairi Stewart, and recently retired Ass. Prof Ed Minot.

The Massey University Animal Ethics Committee approved all procedures for both experiments (Protocol 12/104).

Administration of a GABAergic and serotonergic treatment to assess behaviour of sheep from divergent temperament selection lines

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An experiment was conducted to examine the underpinning neurophysiological mechanisms relevant to the expression of temperament in sheep. The aim was to determine if pharmacological treatments targeting specific neurotransmitter pathways could alter temperament differences between calm and nervous sheep when exposed to an isolation +/-dog challenge. The challenge consisted of exposure to isolation plus a dog, or isolation only, repeated across two days. This was followed on day three by exposure to isolation only for both groups (exposure lasted 10mins). Total movement within the box was measured at 1min intervals using an electronic counter. Only movement within the box, vocalisations and heart rate are discussed. Pharmacological treatments, diazepam and *meta*-chlorophenylpiperazine (*m*-CPP) targeting the inhibitory GABAergic and excitatory serotonergic neurotransmitter pathways respectively were used. Treatments were administered on day three, 20min prior-to the isolation only exposure. It was hypothesised that diazepam would attenuate the stress response (behavioural and/or physiological) seen from exposure to the challenge, whilst *m*-CPP would result in a heightened response to the challenge. There was a selection line by challenge interaction with calm sheep moving less when isolated, compared with the nervous line (calm 158±61, nervous 497±61, *P*<0.05), and a similar pattern was seen for vocalisations (calm 1.2±2, nervous 4.8±2, *P*<0.05) on day 1. A similar non-significant pattern was seen during day 2. The only interaction with the pharmacological treatments (day 3) occurred with the nervous line exhibiting a higher, more variable heart rate after administration of diazepam (calm 108±4bpm, nervous 118±4bpm, *P*<0.05). Temperament selection line (calm<nervous) and challenge differences (isolation+dog<isolation only) were reflected overall. However, results indicate the pharmacological treatments were not effective in altering the response between selection lines using the isolation+/-dog challenge. There was little evidence here to support the notion that altered GABAergic or serotonergic function accounted for behavioural temperament differences between the selection lines.

Kelly completed her PhD at the University of New England with a focus on the neurophysiological regulation of temperament in ruminants under Prof. Geoff Hinch and Dr. Drewe Ferguson. She then went on to a postdoctoral position with Prof. Marian Dawkins at Oxford University investigating factors associated with feather pecking in laying hens. She has recently started at SARDI as a poultry welfare research scientist.

The work described in the abstract complied with the guidelines regulating the use of animals in research and the work was approved by the University of Western Australia's Animal Ethics Committee.

Interpretation and discussion of clinical observations on the effect of backyard confinement on the behaviour and welfare of dogs

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In Australia it is commonly believed to be appropriate to confine pet (non-working) dogs to backyards for some or all of the 24h period. However, carer reports in veterinary behaviour practice indicate that lack of access to a human or the interior of the house are commonly associated with presented problem behaviours. Problem behaviour is considered to be that which reduces the well-being of dog, carer, other person, or any combination of the three parties. Examples from the circumstances in question include: vocalisation, destructiveness, escape and anorexia. The presented problem behaviours have been interpreted using Panksepp's core emotional systems for social affects (SEEKING, FEAR, RAGE, LUST, CARE, PANIC and PLAY). These behaviours or absence of normal behaviour can be considered expressions or consequences of the emotional states of anxiety and/or frustration. However, individual variation in temperament is recognised in dogs. Expressive behaviour may therefore be limited to extravert dogs. If so, the question arises as to whether there are introverted dogs whose welfare is impaired by temporary, prolonged or permanent confinement to backyards. They may, for instance, be "suffering in silence", withdrawn, accepting of the circumstances, or depressed. This suggests the possibility that separation-associated responses are a larger welfare issue than is currently recognised. Intervention options include: avoiding triggering circumstances; providing relaxing company, areas or cues; psychotropic agents; desensitisation; and environmental enrichment. Confining or allowing access to the interior of the house,

particularly the carer's bedroom, is commonly but not invariably reported to result in elimination of the presented problem behaviour. This suggests that the welfare of at least some dogs confined to backyards may be improved by allowing access to some or the entire house interior. It is concluded that the effects of backyard confinement on the welfare of dogs with differing temperaments is worthy of objective assessment.

Robert Holmes is a veterinary and animal behaviour graduate who runs Animal Behaviour Clinics, an international consulting service, predominantly dealing with dogs and cats. He is based in Melbourne with regular visits to Sydney and Adelaide. Currently he is Chair of the Animal Welfare Science Centre Advisory Committee.

The paper is based on the interpretation from an ethological and neuroscientific perspective of generalised clinical observation by a registered veterinary practitioner No animals were used in research as is commonly understood by the term in Australia.

Profiling optimism: Can we use a judgement bias task to create an 'optimism index' for dogs?

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Cognitive bias refers to the tendency for humans and non-human animals to perceive stimuli in a biased way depending on their emotional state. Recent advances in animal welfare science have used judgement bias, a type of cognitive bias, as a means to objectively measure an animal's affective state. This may, in turn, offer an objective measure of not just poor welfare, but also good welfare. It may also offer an insight into dog personality and aid in the selection of dogs for working dog programs such as service dogs. However, there is currently no standard way to compare judgement bias results between individuals. We aimed to develop a way to score individuals in judgment bias and thus easily compare them at a fine scale. The data presented are a part of a larger body of work pioneering the use of a portable, automated apparatus to test the judgement bias of dogs. The apparatus trains dogs in a discrimination task whereby they respond to tones by touching a target. The tone predicts whether the dog will receive a positive outcome (lactose-free milk reward) or a less positive outcome (water) when they touch their nose to the target. Dogs are then given ambiguous 'probe' tones that lie between the learnt tones, and the time it takes them to touch the target is recorded. These response latencies were used to assess the judgment biases of individual dogs. A simple, mathematical model was then developed to produce a possible optimism index for dogs. Detailed examination of the response latencies revealed tipping points where average latency increased by 100% or more, giving an indication of where dogs began to treat ambiguous cues as predicting more negative outcomes than positive outcomes. Variability scores were calculated to provide an index of optimism using average latency and standard deviation at cues after the tipping point. The use of a mathematical approach to assessing judgement bias data in animal studies potentially offers a more detailed interpretation than traditional statistical analyses.

Melissa Starling recently completed her PhD at the University of Sydney, under Associate Professor Paul McGreevy. Her project investigated cognitive bias in dogs as a measure of welfare and personality.

The protocols used in this study were approved by the Animal Ethics Committee of the University of Sydney (Approval no: 20101111 5407). Written consent was obtained from the dogs' carers prior to the commencement of the study. The authors hereby state that the work described in this abstract conforms to regional laws regulating the use of animals in research.

Effect of topical anaesthesia on the cortisol responses of beef calves to castration

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This study examined the effect of a topical anaesthetic (TA) on plasma cortisol concentrations following surgical castration of beef calves. Twenty-four three-month-old Angus bull calves were randomly allocated to (1) surgical castration (C, n = 8), (2) surgical castration with the post-operative application of topical anaesthetic (CTA, n = 8) and (3) sham castration / control (handled and restrained, no castration) (CON, n = 8). Calves were acclimated to handling prior to the experiment. Blood samples were collected via jugular venipuncture at 0.5 h and immediately prior (-0.5 h and 0 h, respectively) to treatment, and at 0.5, 1, 1.5, 2, 4 and 6 h post treatment for plasma cortisol radio-immunoassay. The mean area under the curve (AUC) of CON calves (253 nmol-h/L) was significantly lower than those of C and CTA calves (P = 0.04). The mean AUC of CTA calves (372 nmol-h/L) was lower than that of C calves (394 nmol-h/L), however this difference was not significant (P > 0.05). There was a significant effect of time on cortisol responses across all treatment groups (P < 0.01). Mean plasma cortisol was significantly higher at 0 h (62.77 nmol/L) than -0.5 h, indicating an effect of handling and restraint for the first blood sample (-0.5 h). The effect of treatment on cortisol concentrations approached significance (P = 0.077). A peak in plasma cortisol of C and CTA calves occurred at 0.5 h, indicating a response to castration. CTA calves had lower plasma cortisol concentrations than C calves at 1 h to 4 h, although this difference was not significant (P > 0.05). In this study we have shown the potential for TA to reduce post-operative pain. Cortisol measures pose difficulties when used to evaluate the effects of surgical pain relief where haemorrhage occurs and particularly when TA is applied post-operatively, as increases in cortisol can be associated with the initial trauma and pain of the procedure.

Dominique is completing a PhD at the University of Sydney under Doctor Peter White and Doctor Sabrina Lomax. Her project is investigating practical pain relief options for beef cattle during invasive husbandry procedures.

The experimental protocol in the described study was approved by the institutional animal ethics committee (Approval No. 5832).

Can remote sensing technology improve the welfare of sheep during predation events?

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The predation of sheep (*Ovis aries*) by wild and domestic dogs (*Canis lupis*) is a major issue in Australia, causing serious welfare issues to inflicted animals. This is especially common in extensive production systems, where the level of monitoring can be low. With the low success rates of some current predation control methods, new technologies are being investigated. Two flocks of 15 Merino ewes ranging from 2 to 8 years old (average 4.5 years) were used during simulated dog predation events. UNETracker II Global navigation satellite system (GNSS) devices were fitted around each ewe's neck, and an identification bib attached by elastic under the ewe's abdomen. The "predators" comprised of three trained Kelpie sheep dogs aged 1, 5 and 13 years old that were instructed to carry out the same command simultaneously. These commands included 'round up the flock', 'run around the periphery of the flock', 'walk towards the flock' and 'stand still', with trials ending before any sheep showed signs of overt distress and hence were time limited to 5-12 min. A minimum recovery period of 90 min occurred between trials, with three trials conducted per flock (6 in total). Sheep behavioural responses were recorded and collated from 49 min worth of video records using continuous *ad libitum* sampling during simulated dog predation events. This was then compared with the movement metrics derived from the GNSS devices. Sheep exhibited higher speeds of movement (P<0.001) during compared with before and after a simulated dog predation event. Fourteen different individual sheep and flock behaviours were also recognised during this event, including centripetal rotation (circling behaviour of the flock, with individual sheep seeking the centre). While further research and mathematical modeling of predation events is clearly required, the application of remote sensing technology has the potential to improve future livestock monitoring and welfare of livestock.

Jaime is currently completing a PhD at the University of Sydney under Lachlan Ingram and Greg Cronin. Last year she graduated with a Bachelor of Animal and Veterinary Bioscience with first class honours after undertaking an honours project on sheep predation.

This research received approval by the University of Sydney Animal Ethics Committee (Protocol N00/3-2013/3/5963)

Developing a self-medication method for sheep

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Self-medication occurs when a sick animal consumes substances that are not part of their normal diet and which contain active ingredients that have the potential to improve the animal's health. Self-medicating behaviour has been observed in the wild and experimental settings, with animals medicating for parasitic burdens as well as during purportedly painful conditions. In cases of self-medication, an animal has to first learn that a certain substance can attenuate a negative-state, initially likely through trial-and-error. In experimental settings animals can be taught to self-medicate using a conditioned place preference paradigm and associative learning. If animals can learn to self-medicate when in a negative state, there would be benefits for the livestock industry as it could provide producers with an easy method of pain-relief administration. This project is exploring the potential to administer non-steroidal anti-inflammatory drugs (NSAIDs) orally through feed and to train sheep in a state of pain to self-administer drugs to provide pain relief over a period of several days. NSAIDs were chosen as they are a non-addictive and long-acting. The state of pain will be induced using the methods of a recently developed inflammatory model (Aust Vet J 2011; 89:297–304).Using a cross-over design, sheep will be given the opportunity to distinguish between feed containing NSAIDs and normal feed using flavour cues. If the sheep can learn to self-medicate, their voluntary choice to ingest medications that are non-addictive is a strong indicator that the animals feel pain and are motivated to alleviate that negative affective state. Thus development of a test procedure to examine the choice of sheep to self-medicate would also provide a valuable indicator of affective state in these animals and help us better understand pain and its impacts in livestock.

Danila is currently doing her PhD at the University of New England, working at developing a method of self-medication in sheep. She received a BSc with honours from the University of Adelaide; her project was on the effects of intrauterine growth restriction on stress response in sheep.

KEYNOTE PRESENTATION
Can non-confinement housing for the farrowing sow and her litter be successfully achieved in intensive pig production in Australia?

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In this presentation I review the progress towards designing and evaluating non-confinement housing for the farrowing sow and her litter, as a commercial alternative to the full-confinement farrowing crate. The farrowing crate is an established component of successful husbandry practice, in an era when the majority of pigs are intensively housed. Farrowing crates were developed in the years following World War II, mainly to assist in addressing the need to increase the availability of cheap, safe food (protein) for human populations in post-war Western Europe. Improvement in piglet survival rates was seen as an important way to achieve increased pig production. Up until the 1950s, sows were farrowed indoors in straw-bedded pens or outdoors in huts. Litter size averaged about ten piglets and piglet mortality exceeded 25% of piglets born. The latter mortality is similar to that reported for European wild swine, the progenitor species of the domestic pig (*Sus scrofa*). Further, the majority of piglet deaths occur during the first three days after birth. Thus, farrowing crates were developed in the 1950s to help improve farm productivity by reducing piglet 'wastage', especially during the early days post-partum.

Farrowing crates effectively promote piglet survival (i.e. reduce mortality) in three main ways. First, the design of the crate restricts sow movement with the aim of reducing piglet mortality due to accidental crushing by the sow during posture changing or rolling over. Secondly, a more appropriate thermal environment can be provided during the neonatal period to reduce piglet mortality caused by chilling and related starvation. Thirdly, improved hygiene is possible through the use of perforated floors and better construction materials, helping to reduce piglet morbidity and mortality due to disease. While farrowing crates have been credited with halving piglet mortality, another important issue which is often overlooked is that farrowing crates improve farm worker safety. The crate structure restrains farrowed sows and stops them from attacking the stockperson (in defence of their litter).

In the 1980s, however, farrowing crates were criticised for preventing pre-partum sows from performing species-specific nesting behaviour, with likely negative affects on sow welfare. This prompted governments in Europe, followed soon after the pig industry R&D body in Australia, to fund research aimed at developing non-confinement pen systems for farrowing indoors. However, a persistent problem with farrowing pens has been that piglet mortality is higher in farrowing pens than crates. Understandably, pig producers will be reluctant to install farrowing pens for economic reasons. Higher piglet losses lead to fewer piglets weaned which does not offset the higher capital investment cost of the extra floor space required compared to crates. Also, sows accidentally crush and kill a higher proportion of their piglets in farrowing pens than in crates, which is a clear piglet welfare issue. In addition, genetic selection during the past 50 years in the pig industry has produced sows with larger, longer and heavier bodies, and a higher average litter size approaching 14 piglets. Ironically, in

the early years when farrowing crates were being adopted by the pig industry, it seems likely that many of the genes for 'good' maternal behaviour (i.e. genes relevant for a non-confinement housing system) have been lost through culling reactive sows. It has been argued that the 'best' maternal behaviour in farrowing crates may correlate with the least activity or reaction by sows.

Since the 1980s, applied animal ethologists have greatly increased knowledge about porcine maternal behaviour. Production scientists have also learnt a great deal about piglet survival. Combining these two, there is now a good theoretical understanding of the requirements for the structural and thermal environment to promote piglet survival in farrowing pen accommodation. However, there are a number of major issues still to be resolved before the Australian pig industry will be convinced that farrowing pens can be successfully operated on a commercial basis. The first issue is that the quality of piggery buildings in which farrowing pens are likely to be installed must meet the thermal requirements of the neonatal pig and the sow – these requirements are often quite dissimilar. A significant risk to the success of commercial adoption will occur if pig farmers 'retrofit' existing sheds that are poorly insulated and can't be (adequately) heated or cooled. The second issue, as mentioned above, is that the modern pig industry may have 'lost' (i.e. selected against) the genes for good mothering ability. Thirdly, due to the generally cooler microclimate in farrowing pens compared to crates, it will be important to ensure neonates are viable. A key part of this is that we reduce the incidence of undersized piglets. The successful selection for larger litter size by geneticists has seen an associated larger tail in the distribution of undersize piglets, which are prone to hypothermia. Finally, the importance of stockperson attitudes and skills in managing farrowing pen systems will be critical for the success of the system. At a time when farm labour is less available and stockpeople are necessarily required to spend less one-on-one time with their sows and litters, our challenge is to resolve this gap. Automatic monitoring of key indicators and remote monitoring of farrowing environments may be the way ahead, but much research is still required.

Greg Cronin is Senior Lecturer in Animal Behaviour and Welfare Science at the University of Sydney, based in the Faculty of Veterinary Science, Camden Campus. Prior to moving to the University of Sydney in 2008, Greg was a research scientist with the Animal Welfare Science Centre, based at DPI Werribee. A major focus of Greg's pig research since 1985 was on understanding the interaction between the farrowing environment and the sow and litter, and in particular how maternal and piglet behaviour were influenced and the consequences for piglet survival and growth. During this period Greg developed the Werribee Farrowing Pen as a practical, non-confinement alternative to the conventional farrowing crate.

Validation of modified open field behaviour as a measure of trait anxiety in the dog

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Trait anxiety may be a predisposing factor for anxiety-related behaviour problems in dogs. This study aimed to measure and quantify trait anxiety using novel behavioural paradigms. Diazepam is an anxiolytic drug which can be used to validate behavioural paradigms that are designed to measure anxiety. Greyhound dogs from the University of Melbourne Canine Blood Bank were recruited. Dogs were individually tested in two behavioural paradigms, named the modified open field and the unconditioned substrate preference. The modified open field test consisted of a standard open field test of 10 minutes duration, followed by 6 individual 10kHz 110dB 1-second tones played every 30 seconds, interspersed with continuous white noise played at increasing intensity from 10dB up to 90dB. The test was repeated three times, with two weeks between each test. Greyhounds were pre-treated orally with either a placebo capsule or 1mg/kg diazepam 30 minutes before the third trial (n=39), or alternatively 30 minutes before a single naïve exposure to the test (n=24). Video recordings of the test were analysed using ImageJ with the MtrackJ plugin, which recorded the position of the dog over time. Other behaviours measured including rearing, urinating and defecating. Total distance travelled demonstrated a high test-retest repeatability within subjects (r=0.815, P<0.001; Spearman's correlation) and was significantly increased in both test-naïve (P=0.005) and test-experienced (P<0.001) dogs that had been pretreated with diazepam when compared with placebo (t-test). The effect of a noise tone as a distance-increasing signal over time was analysed, and found to have a significantly reduced effect following diazepam pretreatment when compared with placebo in the test-naïve ($F_{1,66}$=4.6, P=0.036), but not the test-experienced dogs ($F_{1,111}$=2.5, P=0.12) when analysed using a linear mixed model. There was no significant effect of diazepam pretreatment on thigmotaxis behaviour in the modified open field. The unconditioned substrate preference test consisted of a room that was half covered with plastic while the other half was concrete (a substrate familiar to the greyhounds). There was no effect of diazepam pretreatment on preference for the novel plastic floor substrate. This study suggests that the anxiolytic effect of diazepam on dog behaviour may be measured through an increase in exploratory behaviour and a reduction in noise aversion. Furthermore, the exploratory behaviour and noise aversion may represent aspects of underlying trait anxiety as these behaviours have a reliable test-retest repeatability.

Dennis is completing a PhD at the University of Melbourne, on the measurement of behavioural traits in dogs that may predispose to behaviour problems, supervised by Professor Fisher, Dr Carter and Professor Lawrence. His BSc(Hons) from Melbourne University, under Professor Lawrence, was on the behavioural sensitization to cocaine in a transgenic line of mice.

This research study was carried out with the approval of the relevant University Animal Ethics Committee and was in accordance with Victorian laws governing the use of animals in research.

The Impact of Road Transport on Sheep

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The present study examined whether observers could distinguish sheep behaviour during road transport under different conditions in Australia. Using Qualitative Behavioural Assessment (QBA), the effects of three factors were evaluated: trailer crate type (convertible or standard), the breed of sheep (Australian Merino or Fat tail), and the point of origin of the sheep (from saleyard or feedlot). Sheep were videorecorded as a group (n=3-6), during 56 short-haul (1-2 h) road journeys, and footage selected from the first 15 minutes of the journey (1-2 min clips) shown to 26 observers, who were naive to treatment and had varied levels of sheep experience. The routes taken were typical of commercial journeys and included periods of continuous and stop-start driving from either the saleyard or feedlot. Sheep selected for filming were located in the front pen of the top deck of the front crate of commercial livestock transport vehicles. Output from Generalised Procrustes Analysis (GPA) of observer scores produced a mean consensus profile which differed significantly from a randomised profile ($p < 0.001$). To investigate treatment effects, a one way ANOVA was performed on the GPA scores for each analysis. Observers distinguished between the behaviour of sheep transported in different crate types ($p < 0.001$) and between breeds ($p < 0.05$) but not between those loaded at different origins (feedlot versus saleyard). On the main behavioural dimension (GPA 1) sheep in the standard crate were described as more *calm* and *relaxed* while those in the convertible crate were described as more *agitated* and *anxious*. Fat tail sheep were scored as significantly more *agitated* and *distressed* while the merino sheep were described as more *calm* and *relaxed* on GPA dimension 1. These findings suggest that QBA could contribute to assessing the experiences of sheep undergoing road travel and assist in identifying specific stressors during transport.

Teresa Collins is a Senior Lecturer in Animal Welfare and Ethics at the College of Veterinary Medicine at Murdoch University with major research interests in objective measures of welfare.

All work was performed in accordance with the Murdoch University Animal Ethics Committee.

Loose farrowing sows-Piglet danger areas as temperature increases.

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The PigSAFE (Piglet and Sow Alternative Farrowing Environment) loose farrowing pen is designed to allow the sow to perform maternal behaviours such as isolation, nest building and bonding with piglets. The Australian design incorporates a solid floor nest area, nesting material, sloped walls, a heated creep area, a feeding stall and a separate slatted dunging area which includes a spray mister and cooling fan. The aim of this experiment was to assess piglet location preferences as ambient temperature increased naturally. The hypothesis was that piglets would prefer to lie in cooler areas of the pen (i.e. dunging area) as temperature increased. One hundred and twenty sows (Large White x Landrace; average parity =1) and their litters (average born alive =11.2 ± 0.18) were randomly selected over four time replicates. The experiment began in March and finished in August 2012. The location of the piglets was recorded by scan sampling on a daily basis (0930 and 1430hrs) over lactation. The internal shed temperature was recorded from *in situ* temperature loggers located on the wall of the shed immediately prior to the behaviour observations. The scan data were converted into percentage of the litter in each location. General Linear Models were used to analyse the differences in location at different temperature ranges i.e. T1 = less than or equal to 15.7°C up to T6 = greater than 32.9°C. When temperatures were below 24.3°C, piglets were found predominantly in the creep area ($P<0.001$). As temperature increased, more piglets were located in the cooler dunging area of the pen ($P<0.001$). Piglets and sows may share common cooler areas during summer and during this time piglets may be in danger of being overlain by the sow.

Rebecca Morrison is the Animal Welfare Programs Manager for Rivalea Australia. Rivalea Australia is a large commercial piggery with a dedicated Research and Innovation department committed to conducting research in the area of pig welfare, housing, nutrition, meat science, genetics, health and reproduction. Prior to this, Rebecca was the Sustainable Swine Production Systems Scientist at the University of Minnesota, USA. Rebecca's research has focused on deep-litter group housing for growing pigs, gestation sow housing, loose farrowing systems, pain assessment/ pain relief for tail docking of piglets. The majority of welfare related research conducted at Rivalea Australia is supported by Australian Pork Limited and the Pork CRC.

All animal procedures reported in this abstract were conducted with prior institutional ethical approval under the requirements of the NSW Prevention of Cruelty to Animals Act 1985, in accordance with the National Health and Medical Research Council/Commonwealth Scientific and Industrial Research Organisation/Australian Animal Commission Code of Practice for the Care and Use of Animals for Scientific Purposes.

The effect of zoo visitors on reptile behaviour

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Research has shown that visitors may be stressful for some zoo animals but visitor effects have not been studied in reptiles. We investigated the effects of visitor behaviour on the behaviour of reptiles housed in three enclosures in the reptile house at Zoos Victoria, Melbourne: two Rhinoceros Iguanas (*Cyclura cornuta*), one Philippine Sail-finned Water Dragon (*Hydrosaurus pustulatus*), five Star Tortoises (*Geochelone elegans*), and two Fijian Crested Iguanas (*Brachylophus vitiensis)*. Two treatments were imposed: 1. Unregulated visitor interactions and 2. Reduced visitor interactions, where signs were used requesting visitors to be as quiet as possible and not to touch the glass. Data were collected on weekdays with the treatments randomly imposed on 20 days (total 10 replicates of each treatment) within a 4-week period. Direct behavioural observations were made from 10:00 – 14:30 h, with each enclosure being observed for twelve 5-min periods at 15-minute intervals using a combination of instantaneous scan and continuous sampling each h. Reptile posture, mobility, position in enclosure and orientation (from viewing window) were recorded and visitor number and noise level (using a decibel logger) were recorded at 0 and 5 min sample points in each 5-min period. From 0.5-4.5 min in each 5-min period, continuous observations were made on other visitor and reptile behaviours (e.g. head flick and head bob by the reptiles and banging on glass and fast movement by visitors). Two-way analysis of variance was used to examine treatment and species effects, using the appropriate transformations where necessary. The regulated treatment reduced visitor noise level (P=0.0001) and banging behaviour by visitors (P=0.0001). Furthermore, the regulated treatment increased the proportion of observations that the reptiles were recorded facing towards visitors (P=0.012) and mobile (P=0.057) which was defined as moving including walking, running and/or swimming. Reductions in the proportion of observations that the reptiles were recorded lying (P=0.028) and stationary (P=0.055) were also found under regulated conditions. These results suggest that reducing the intensity of visitor interactions reduces the fear of visitors on the basis of less avoidance behaviour seen in reptiles. However further research, including examining stress, is required to understand the welfare implications of visitor effects on reptiles.

I am completing this research project as part of my Master of Animal Science course at the University of Melbourne. The results from this project will enhance our understanding of how visitors and potential factors may influence reptile behaviour and welfare, highlighting approaches to optimize visitor experience and improve zoos in their role in education and species conservation. I have a Bachelor of Science degree with a major in Animal Health and Disease from the University of Melbourne. I aspire to work in the animal welfare field and make improvements to help wildlife conservation.

This project has been ethically approved by Zoos Victoria Animal Ethics Committee (AEC).

Effects of different mining noise amplitudes and frequencies on the behaviour and welfare of wild mice (*Mus musculus*)

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Anthropogenic activities like mining are the most important cause of noise for wildlife. Regulations apply when it constitutes a human hazard but there is no information on the possible damage to wildlife. We exposed wild mice to a simulated mining noise sequence containing open cast mining machinery (n = 36). Two levels of amplitude were set to exemplify energy inputs encountered at 0 - 500 metres (70-75 dB; High Noise treatment (HN)) and 500- 1000 metres (60-65 dB; Low Noise Treatment (LN)) from the mining site. In a second experiment (n= 57) , two levels of frequency at HN amplitude were set to explore differences between Low Frequencies (below or equal to 2000 Hz, LF) and High Frequencies (above 2000 Hz, HF). Understanding the frequencies most damaging to wildlife could enable attenuation of the noise to be targeted at these frequencies. A Control (C), where animals were exposed to only background laboratory noise below 55 dB was included in both experiments. Mice were exposed to their respective stimuli for 3 weeks and behaviour was recorded continuously using surveillance cameras to analyse stress-related behaviours. Animals were euthanized as part of the colony's procedures and spleen, adrenal glands and thymus were collected, weighed and preserved for histological examination. Our results from the amplitude experiment show an increase in the time spent circling (stereotypical behaviour) in the HN treatment when compared with LN or C (HN = 34.7 s/h, LN = 8.1 s/h, C = 3.4 s/h; p< 0.001). In male mice exposed to HN, the spleen was lighter than in C, suggesting an adverse effect on immunocompetence (HN = 0.017 g; C = 0.023 g; p = 0.042). In the frequency experiment, female mice had smaller spleens when exposed to HF compared with LF and C (HF = 0.023 g, LF = 0.030 g, C = 0.032 g, p= 0.049). It is concluded that mining noise affects the behaviour of wild mice, potentially in an adverse manner, since stereotypies occurred concomitantly with a reduction on spleen weights, which is a trait observed on mice exposed to other kinds of environmental stress due an increase in corticosterone. Thus, faecal corticosterone will be tested for further interpretation of the observed behavioural patterns.

Karen is completing a PhD in Veterinary Science (focusing on behaviour and welfare) at UQ, investigating the effects of anthropogenic noise on wildlife welfare and behaviour using the wild mouse as an animal model, under Professor Clive Phillips. Her MSc from the National Autonomous University of Mexico (UNAM) was on the effect of tree coverage on some welfare indicators of tropical cattle.

This research and the wild mice breeding colony were approved by the Animal Ethics Committee (AEC) of UQ (research approval numbers: SVS/145/12, CAWE/054/13; colony permit number: SAS/071/10/BREED (NF)). The AEC ethical guidelines

conform to the regional laws regulating the use of animals in research as well as the ISAE Ethical Guidelines.

An investigation into the efficacy and welfare implications of associative learning in puppies using positive and negative conditioning

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Many training methods used to modify dog behaviour utilise the principles of operant conditioning. The consequences of operant conditioning can increase or decrease the display of targeted behaviours by associating behavioural responses with appetitive or aversive stimuli. The aim of this experiment was to compare the efficacy and welfare implications of the four operant conditioning procedures. Fifty 6-week-old puppies were either positively (access to food) or negatively (denied access to visible food) conditioned to an auditory tone (15 trials). Puppies were then further allocated to one of four treatments: positive reinforcement and negative punishment (positively conditioned puppies); and positive punishment and negative reinforcement (negatively conditioned puppies). The operant conditioning procedures were then used to train the puppies (8 x 1-minute trials) to approach or avoid a novel object (baby toy) by placing them in an arena (1.2m x 1.2m) and applying or ceasing the conditioned tone when the puppy crossed a line 60cm away from the object. Saliva samples were taken immediately prior to the first trial and then after even-numbered trials to assess cortisol levels. While there was no difference between the effectiveness of positive and negative punishment, preliminary results indicate that positive reinforcement was more effective at training a puppy to approach a novel object than negative reinforcement (approached more often and in a greater proportion of trials, $P<0.05$). This result needs to be considered with caution, as puppies in this treatment may have focussed on escape rather than learning, as their initial arena environment was negative (negative tone playing) compared to neutral (no tone) or positive (positive tone). Analysis of cortisol samples is presently underway. This experiment indicated very little overall difference in the efficacy of different operant conditioning procedures to train a new behaviour in 6-week-old puppies.

Catherine is completing a PhD at The University of Melbourne on the efficacy and welfare implications of learning theory principles, as well as specific training methods, on dogs, under the supervision of Professor Paul Hemsworth and Dr. Robert Holmes. Catherine completed a Master of Animal Science at The University of Melbourne in 2010, which focussed on the effect of citronella and odourless spray collars on aversion in dogs.

This project was approved by the Animal Ethics Committee of The University of Melbourne (1212389.1).

POSTER PRESENTATION
Investigating isolation box testing in sheep

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The Isolation Box Test (IBT) is used to ascertain the anxiety of sheep in both a research and field setting. Much of the published data uses an automated method to measure anxiety. Recently, a move back towards manual scoring has occurred. The current study investigated relationships between different behaviours measured in the IBT to determine the most appropriate measures for use in a larger study. The current study tested 45 4-year old crossbred ewes. Each was individually isolated and placed into the IBT for duration of 1 minute (IBT dimensions 105cm $\times$ 75cm $\times$ 42cm). Within the IBT the ewe's vocalisations and a variety of movement measures (turns, steps, paws and jumps) were counted. The IBT was repeated twice, on day 0 and again on day 79. The results were analysed using Spearman's Rank correlations to investigate relationships between the counts of the different behaviours measured and whether or not they differed across the two tests. It was found that the vocalisations across the two testing days were strongly correlated ($R^2 = 0.491$, $P < 0.001$). All four of the movement measures were correlated between tests (all $R^2 > 0.38$, all $P < 0.02$). Within both tests, the number of steps and turns were correlated with each other (test 1: $R^2 = 0.717$, $P < 0.001$, test 2: $R^2 = 0.37$, $P < 0.01$). The sum of movement behaviours (total movements) were correlated with turns, steps and paws in test 1, and turns and steps in test 2 (all $R^2 > 0.39$, all $P < 0.008$). No movement behaviours were correlated with vocalisations. These results suggest that manual scoring of the IBT is repeatable and that it is important to include both vocalisations and movement measures in future studies as these may represent different aspects of anxiety.

Kirsty is completing her Bachelor of Animal Science (Honours) at Charles Sturt University on utilizing proximity loggers to access normal social interactions within a flock of sheep under Rebecca Doyle and John Broster.

This test was performed under the ethics approval of Charles Sturt university, proposal number 13/107.

POSTER PRESENTATION
Sow behaviour before and during farrowing in confinement and non-confinement housing

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The restrictive environment of farrowing crates prevents sows from performing highly motivated nesting behaviours. This restriction can increase stereotypic behaviours, limit important maternal behaviours, and consequently negatively impact welfare. The aim of this study was to investigate the behaviour of sows housed in confinement versus non-confinement farrowing accommodation during nesting and parturition. Sows were housed in a standard farrowing crate (control), swing-sided pen with sides closed (closed) or swing-sided pen with sides open (open) for the entire experimental period. The farrowing crate and swing-sided pen measured 1.7 x 2.4m and 2.8 x 2.15m respectively. Seventeen sows were video recorded during the nesting period (five hours before the birth of the first piglet) and 36 sows during the farrowing period (birth of the first piglet until the birth of the last piglet). Behaviours measured included percent of time engaged in nesting behaviour and stereotypic behaviour, average posture changes and number of sow-piglet interactions per hour. During parturition, closed sows performed significantly more posture changes compared to open and control sows with 15.85 ± 2.95, 8.26 ± 1.48 and 5.53 ± 1.2 average posture changes per hour respectively ($P<0.05$). Sow-piglet interactions were lower ($P<0.05$) in control compared to open sows, with 2.44 ± 0.43 and 6.87 ± 1.04 average interactions per hour respectively. The proportion of time spent engaged in stereotypic behaviours during the nesting period was positively correlated with the average number of posture changes performed per hour during parturition ($r = 0.591$, $P = 0.013$). The proportion of time engaged in nesting behaviour during the nesting period was positively correlated with the average number of sow-piglet interactions per hour during parturition ($r = 0.612$, $P = 0.02$). These results suggest that sow behaviour during the nesting period may influence how the sow will behave during parturition and that sow confinement may impair maternal behaviours during parturition.

Patricia is completing a PhD at the University of Adelaide, on improving welfare and performance of sows and piglets in alternative farrowing and lactation housing, under Dr William van Wetter, Dr Kate Plush and Professor Alan Tilbrook. Her Honours from Adelaide University was on the effect of dietary restriction on reproductive performance of gilts.

This study followed the Model Code of Practice for the Welfare of Animals Pigs (Third Edition) and was approved by the Animal Ethics Committee of the University of Adelaide.

POSTER PRESENTATION
Effects of change in keeping method on elephant welfare at Melbourne Zoo

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In late January 2014, the keeping method of the Asian elephants at Melbourne Zoo (n=8) transitioned from free-contact to protected-contact. The free-contact keeping method involves both positive and negative reinforcement, where the keeper and the elephant share the same space. Protected-contact involves the keeper having contact with the elephant through a protective barrier. The aim of protected contact is to increase keeper safety and eventually eliminate the need for negative reinforcement. This study examines the potential implications to the welfare of the elephants over time after the shift from free-contact to protected-contact, by measuring a range of welfare indicators, including response to keeper commands with use/frequency of positive and negative reinforcement, general behaviours (ethograms), vocalisations, exercise, body condition, foot health, compliance with medical treatment, and stress measured through cortisol levels in faeces. General behaviour will be recorded between 1015 and 1500 h for 24 days during 3 time periods over 14 months. Each elephant will be observed for 15 minutes during each day (with behaviour recorded every 15 sec), for a total of 60 per time period. The first observation period has been completed. Three of the elephants (Mek Kapah, Kulab and Bong Su) performed stereotypical behaviour (swaying, pacing and head bobbing) during a proportion of the observation period (27.7% $\pm$ 2.2%, 24.2% $\pm$ 2.2% and 34.8% $\pm$ 2.5% respectively), though other non-stereotypic behaviours were performed concurrently with these stereotypies. In addition, these three individuals exhibited the greatest number of conspecific aggressive occurrences during the observation period, which could also be indicative of sub-optimal welfare. Further data collection and analysis will allow comparison of welfare indicators across all three phases to assess potential changes over time after the shift from free-contact to protected-contact.

Kristy is completing an MPhil at the University of Melbourne, within the Animal Welfare Science Centre, on the welfare effects of the elephants at the Melbourne Zoo after a change in keeping method, under Dr. Ellen Jongman and Dr. Michael Magrath. Her Bachelor of Environmental Science, majoring in zoology and geography, with honours in freshwater ecology and toxicology was from Monash University.

The work described in the abstract conforms to regional laws regulating the use of animals in research, as the project has been approved by the Zoos Victoria Animal Ethics Committee (ZV13016).

POSTER PRESENTATION
Space allowance affects aggression at mixing in group housed, early gestating sows

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Aggression among domestic sows is highest when hierarchies are being formed and can result in stress and impaired reproduction. Aggression can be influenced by manipulation of the mixing environment. We investigated whether space affected aggression and stress at mixing. The experiment used 132 multiparous Large White x Landrace sows mixed into groups of six, after insemination, which were allocated 2 (LOW), 4 (MED) or 6 (HIGH) m^2/sow. On the fourth day after mixing pens were equalised to 2 m^2/sow. Behaviour (six hours, including feeding; fighting, displacements, bites, knocks, fleeing, lunges, eating, active, resting, non-aggressive contact and mounting) was recorded at mixing (0) and day 1, 3 and 4. Salivary cortisol and injuries were collected on these days and the day before mixing. HIGH sows fought less than LOW sows ($P<0.05$) on day 0 (3.8 ± 0.48 versus 6.2 ± 0.44 fights) and day 1 (1.2 ± 0.43 versus 2.6 ± 0.46 fights), and aggressive bouts were shorter ($P < 0.05$) on day 1 for HIGH compared to MED and LOW sows (5.7 ± 2.21 sec versus 9.5 ± 2.45 sec and 8.9 ± 2.08 sec respectively). The percentage of time spent fighting was also lower in the HIGH group than both the LOW and MED on day 0 ($0.16\pm0.04\%$ versus $0.27\pm0.04\%$ and $0.31\pm0.09\%$, $P<0.02$) and day 3 (0.04 ± 0.04 versus 0.12 ± 0.04 and 0.14 ± 0.04, $P<0.02$). When space was equalised, sows from the HIGH treatment fought more often (3.80 ± 0.43 vs 2.39 ± 0.48 fights, $P< 0.05$) and for longer (9.19 ± 2.23 sec vs 6.37 ± 2.46 sec, $P<0.05$) than the MED sows. Cortisol concentrations were significantly ($P < 0.01$) lower over the treatment period for sows in the LOW compared to MED and HIGH treatment groups (12.24 ± 5.81 versus 18.41 ± 5.82 and 20.20 ± 5.72 nmol/L, respectively). Conception rate remained unaffected. Increased space allowance at mixing reduces aggression between sows. However, a reduction in space after four days increases aggression in animals allowed higher space beforehand. Further work into aspects of mixing pen design is required.

Emma Greenwood is completing a PhD at the University of Adelaide, SA, focusing on reducing aggression in sows at the point of mixing through altering environmental factors. Her honours focused on the effects of hygiene on the nutritional requirements of sows in late gestation and phase feeding of late gestational sows.

POSTER PRESENTATION
Development of Evidence-based Housing and Husbandry Guidelines for Animals Used in Teaching and Scientific Research

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In Australia, the NSW Animal Research Review Panel began developing evidence-based housing guidelines for commonly used research animals about 15 years ago. The objectives are to provide research establishments with guidance on animal housing that meets the physical and behavioural needs of animals and promote good science. Commencing with a comprehensive literature search of refereed scientific journals and reference books, findings are grouped into topics including: Normal animal behaviour; Cage or enclosure design; Animal care and management (including social environment and environmental enrichment) and Environmental variables (including light, temperature and ventilation). Points of agreement and matters of conjecture are discussed. Significant background information is documented and used to develop principles and recommendations, citing relevant literature. Draft guidelines are referred to international experts for comment and edited accordingly. Edited drafts are widely circulated to Animal Ethics Committees, animal welfare groups, national and international bodies such as Australia's National Health and Medical Research Council and the Canadian Council on Animal Care, and people with internationally recognised expertise in housing the respective species. Comments received are collated and assessed. The guidelines are amended where appropriate. To date, guidelines have been published for dogs, rabbits, rats and guinea pigs, mice and sheep. They will be revised periodically with advances in the understanding of animal physiology and behaviour, technological advances, and changes in community attitudes about animal welfare. The guidelines are available on the Animal Ethics Infolink website: http://www.animalethics.org.au

Peter Johnson is a Veterinary Officer with the Animal Welfare Unit Biosecurity NSW. He conducts routine inspections of accredited animal research establishments on behalf of the NSW Animal Research Review Panel and the NSW Department of Primary Industries.

POSTER PRESENTATION
Should I stay or should I go? Ranging distance in free-range laying hens

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Australian free-range egg production currently contributes about 38% of retail eggs. Nevertheless, ranging behaviour in free-range commercial flocks remains poorly understood. We investigated the behaviour of free-range laying hens upon exiting pop-holes with a focus on distance travelled and external factors that drew hens into the outdoor range. A commercial flock of 8,000 Hy-line brown laying hens with access to a range was studied over 14 days in winter in Western Victoria. Behaviour was recorded using four video cameras linked to a digital recording system. Videos were analysed by one observer selecting 5 focal hens to exit a pop hole at 0830h, 1130h, 1430h and 1730h. Observations were made sequentially for 5 min or until hens disappeared from the field of view (FOV) of ~300 m². Measures included the estimated distance travelled, number of stops, destination, whether it joined a group and group size joined. Data were analysed using Minitab statistical software. Maximum temperature was 15.0 ± 0.9 ℃ with cloudy conditions. In total, 258 hens were observed, covering a distance of 6.4 ± 0.2 m with 1.2 ± 0.1 stops. For destinations, 52% of hens stayed within the pop hole area 1 m alongside the shed whereas 25, 9 and 14 % of birds ended up in bare earth area (1-9 m), tree coverage (>9 m from the shed) or went back into a pop hole, respectively. Only 28% joined a group of 4.9 ± 0.6 hens at 1.8 ± 0.3 m from the shed. Distance travelled was influenced by duration of observation ($P < 0.01$), but not group size or group distance. Only 8% of hens stayed within the FOV for 5 min, reflecting the difficulty of visual observation on individuals in a commercial outdoor range. Replication is required to better understand space use in outdoor systems.

Lena Ly is a Master student at the Animal Welfare Science Centre, working on the behaviour of free-range laying hen under the supervision of Jean-Loup Rault.

POSTER PRESENTATION
Investigation of the relationship between personality and judgement bias in dogs

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Judgement bias has been investigated in many species, including dogs, to identify affective states in relation to different treatments, but large variations exist within treatment groups. This study aimed to investigate whether an individual animal's variation in behaviour, or 'personality', could influence their inherent judgement bias. It was hypothesised that dogs with more anxious personality traits would have a more 'pessimistic' judgement bias than other personality types. For the study 35 dogs were recruited from Charles Sturt University staff and students. The personality of each dog was evaluated using the Behavioural Assessment for Re-homing K9's (B.A.R.K protocol), an objective behavioural assessment of temperament, and a copy of the Monash Canine Personality Questionnaire-Revised (MCPQ-R) was sent to owners to subjectively rate their dog's personality. Dogs then underwent a spatial judgement bias test where they first learnt to discriminate between a negative, unrewarded bowl location and a positive, rewarded bowl location. Dogs were then tested for their response to three ambiguous bowl locations; near positive (NP), middle (M) and near negative (NN). Results found that no B.A.R.K or MCPQ-R personality dimensions had an effect on judgement bias latency. Sex ($P=0.28$), Desex Status ($P=0.98$) and Breed Group ($P=0.99$) also had no effect, however Bowl Location was highly significant ($P<0.01$). The probability of the dog running to the positive location was $P(A)= 0.99$ and this decreased at the Bowl Location approached negative; NP ($P(A)=0.90$), M ($P(A)=0.84$), NN ($P(A)=0.62$), N ($P(A)=0.29$). This result was to be expected and indicates the constructive soundness and appropriateness of the judgement bias test in this study. However, as personality had no effect, this study was inconclusive. Further research is therefore warranted, especially with the use of different personality assessments.

Xanthe is completing a Bachelor of Animal Science (Honours) at Charles Sturt University in Wagga Wagga, NSW. Her project, supervised by Rebecca Doyle aims to uncover whether personality has a relationship with the cognitive biases of dogs

The Charles Sturt University Animal Care and Ethics Committee, in accordance with the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes, approved all procedures in this experiment (protocol number 14/010).

Dogs with separation-related distress: they're not all the same

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Separation-related distress is a common behavioural disorder, diagnosed in an estimated 14-17% of companion dogs. It can have a devastating effect on the human-animal bond, with affected animals often being relinquished or euthanased. It has traditionally been defined as occurring only when dogs are separated from their owners, but this may be too simplistic. As part of a PhD research project on the genetic basis of canine separation-related distress, we have administered behaviour questionnaires to dog owners and received 523 responses. Participants were self-selected, responding to an advertisement in breed or obedience clubs, veterinary clinics or boarding kennels. The majority of dogs described were golden retrievers and Labrador retrievers. The questionnaire used for phenotyping separation-related cases was based largely on Canine Behaviour and Research Questionnaire (C-BARQ) developed by Prof James Serpell. Owners scored the frequency of behaviours that their dogs showed when about to be left alone or when alone. Scoring ranged from never=0 to always=4. The most common signs reported were agitation, pacing, barking and whining. In addition, 59 owners were sent a request to answer additional questions. These owners had made comments in the C-BARQ on the specific circumstances when their dogs exhibit distress, and the additional survey questions were aimed at quantifying these comments. Forty-three owners responded. Approximately half the dogs were reported to show distress (such as vocalisation, agitation, hyper-salivation or destruction) when left totally alone. The remaining dogs were reported to show distress when separated from one particular individual, possibly indicating hyper-attachment. For seven dogs, this individual was a canine companion. Recognising different mechanisms for the development of separation-related distress may influence treatment of affected dogs.

Diane qualified as a veterinarian in 1990 and is currently undertaking a PhD at the University of Sydney on the genetic basis of canine separation-related distress disorder, under the supervision of Professor Claire Wade.

This research has the approval of the University of Sydney Animal Ethics Committee.

ART PIECE
Making art with equines towards renegotiating interspecies response-ability

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During 2013 equine welfare scientist Prof. Paul McGreevy gave artist, curator and PhD candidate (University of Sydney) Madeleine Boyd access to video files from a horse whipping in racing assessment project. The ultra-slow motion footage was used by McGreevy et al. during a multifaceted analysis of whipping practices and the effectiveness of whipping in horse racing. The intention of that project was to assess the relative benefits of whipping in regards to the detrimental impact on equine welfare. Madeleine Boyd's PhD project is concerned in part with making art with equines towards renegotiating interspecies response-ability. Additionally, in regards to critical science studies and the increasing mingling of arts and science in contemporary practice, Boyd took the opportunity of engaging with McGreevy's research to pose the question of how equine welfare science could move into performative art practice and how such an art practice might provide ways understanding data that complement the traditional science formats of numerical analysis and written publications. The outcome includes a written paper on histories of whipping and racing practices (based on comparison of Natasha Fijn's Mongolian and Rebecca Cassidy's contemporary racing equine ethno-ethologies) with a theory of emergent justice, as well as a performance video and video stills. The performance was conducted with an equine as an interspecies collaborative work. Boyd created a character named 'the barefoot jockey' and worked with the equine according to positive reinforcement training methods so as to switch the role of the whip from driver to pointer.

Madeleine is a final year PhD candidate enrolled at the Sydney College of the Arts, University of Sydney. Her PhD research project considers that through art practice creative and informative engagements with non-human species can be demonstrated. Working with two companion equines, Madeleine has produced several series of images and videos. These artwork practices are informed by positive reinforcement training and equine welfare research and aim to demonstrate a renegotiation of human-equine relations. Details on the concept of Madeleine's work and examples can be found here: http://intraactionart.com http://madeleineboyd.wordpress.com