



Standard Operating Procedure **Novel Surface Test - Individual**

Tania Wolfe^{1,2}, Marjorie Cellier^{1,2}, Aimee Xu^{1,2}, Shabnaz Mokhtarnazif^{1,2}, Nadège Aigueperse^{2,3}, Abdoulaye Baniré Diallo^{2,4}, Elsa Vasseur^{1,2*}

¹ Department of Animal Science, McGill University, Sainte-Anne-de-Bellevue, Quebec H9X 3V9, Canada

² Research and Innovation Chair in Animal Welfare and Artificial Intelligence (WELL-E), McGill University, Sainte-Anne-de-Bellevue, Quebec H9X 3V9, Canada

³ INRAE, VetAgro Sup, UMR Herbivores, F-63122 Saint Genes-Champanelle, France

⁴ Département d'informatique, UQAM, Montreal, Quebec, H2L 2C4, Canada

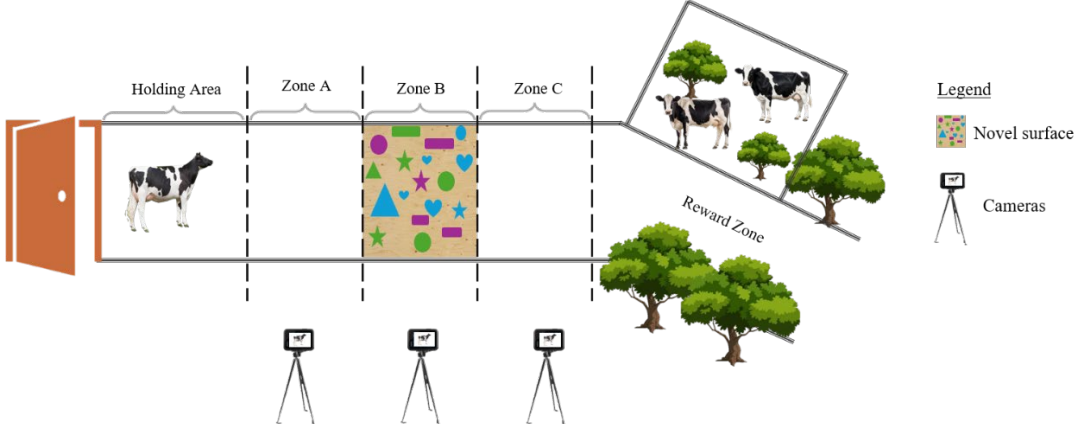
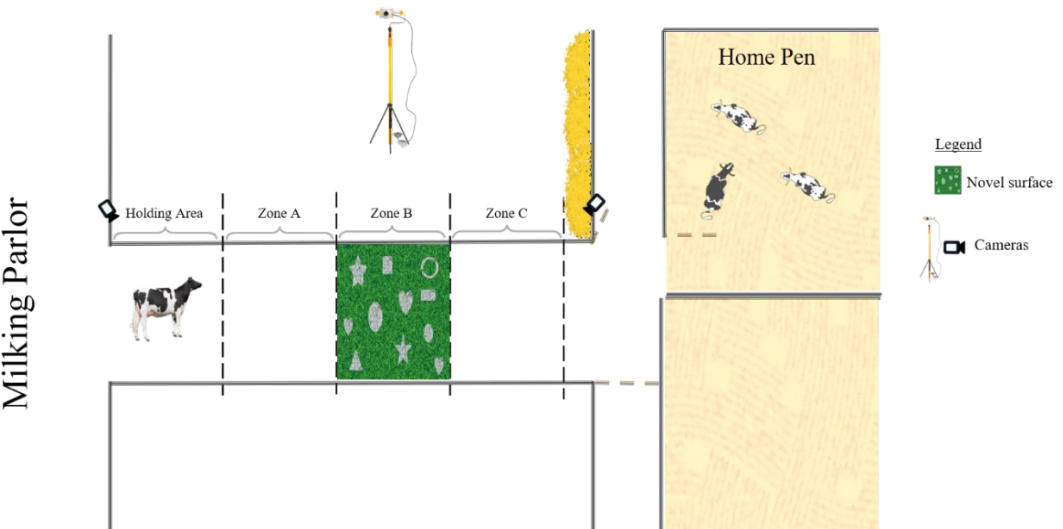
*Corresponding author: elsa.vasseur@mcgill.ca

Description/objective

The Novel Surface Test (NST), also known as the Risk-Taking Test, evaluates cows' willingness to cross an unfamiliar surface placed in their normal walking path. The test measures individual and group-level differences in approach-avoidance and risk-taking tendencies under mild uncertainty. This test can be performed in different environments and is designed to test single or multiple animals in one testing session. *The test procedure described in this SOP is performed in two different types of corridors and is designed to test a single animal.*

Last updated: September 17, 2026

Terminology

Corridor types:	
Outdoor corridor:	The novel surface was installed in an outdoor corridor routinely used by the animal (e.g., a corridor providing access to an exercise yard). Animals were encouraged to progress through the test corridor by the presence of conspecifics housed in a pen located beyond Test Zone C, which served as the reward stimulus.  Figure 1. Illustration of the test corridor showing the novel surface (e.g., plywood with yoga mat pieces glued in different shapes), the test zones (A, B, and C), and the reward zone located beyond the test area.
Indoor corridor:	The novel surface was installed in an indoor corridor routinely used by the animal (e.g., a corridor providing access to the milking parlour). Animals were encouraged to progress through the test corridor by the presence of conspecifics housed in a pen located beyond Test Zone C, which served as the reward stimulus.  Figure 1. Illustration of the test corridor showing the novel surface (e.g., artificial grass with painted shapes), the test zones (A, B, and C), and the reward zone located beyond the test area.

Surface:	
Novel surface:	The novel surface must provide secure footing and minimize the risk of injury by being non-slippery. It should cover the full width of the corridor and allow the animal to take a minimum of two steps on it while crossing. The surface must be unfamiliar to the animal and should be of a size, colour, and pattern that ensure clear visibility to both the animals and the video cameras within the corridor. Importantly, it should contrast clearly with the corridor floor so that the animal can visually detect it before stepping onto it, rather than only perceiving it upon contact. Hatch or striped patterns may be used to enhance the perceived risk associated with the surface by creating an illusion of depth or discontinuity, thereby increasing the challenge. This is particularly relevant because the test is intended to assess responses not only to novelty but also to perceived risk. If the test is repeated, the same surface material must not be reused to maintain novelty.

Requirements

✓ Personnel (n = 3 - 4):

Personnel	Number	Role
Testing assistant	1	Responsible for wait times and test sequence.
Camera manager	1	Responsible of managing the camera operation (i.e., installing the cameras, validating the views and starting/stopping the recording) and test safety.
Trained handler	1-2	Responsible for handling of animal to and from the test corridor and for handling animal during the test.

✓ Materials Needed:

- Novel surface
- Stopwatch
- Whiteboard
- Dry erased marker
- PPE
- Camera(s)
- Power source for camera(s) (i.e., extension cords, power bank with AC outlet)
- Cones or floor markers

General information

- **Location:** The test corridor must be designed to ensure both animal safety and appropriate testing conditions. It should be enclosed by gates of sufficient height to prevent animals from escaping. The flooring or ground surface must provide secure footing and minimize the risk of

injury by being non-slip (e.g., rubber mats, grooved concrete, or sand). The corridor should be wide enough to allow animals to move freely (e.g., a minimum width of 3 m for cattle). A reward should be positioned at the end of the corridor to encourage animals to move through the test area and cross the novel surface.

- **Lighting and noise conditions:** The test environment must be sufficiently illuminated to ensure a clear video recording of the animal. To perform a reliable and reproducible test all potential distractions must be avoided, as such the presence of non-essential personnel and any unnecessary noise during testing is strictly prohibited.
- **Camera positioning:** Camera(s) should be positioned to perfectly cover the animal, the holding area and the 3 zones of the test corridor.
- **Animal preparation:** To avoid confounding effects, test animals should be familiar with the corridor and the route used during testing. If companion animals are used as a reward at the end of the corridor, they should be placed in the designated pen before the test begins.
- **Test preparation:** Cones or floor markers should be used to delineate the three zones.

Procedure

1. A camera manager sets up the cameras, initiates recording for all cameras and verifies that the field of view for each camera is correctly aligned to ensure full coverage of all 2 test zones (Figure 1, 2).
2. A camera manager writes on the whiteboard the information that will allow to identify the video (animal ID, test being conducted, date and time) and displays it in all camera views.
3. A trained handler guides the animal into the holding area of the test corridor (Figures 1 and 2) and releases it near the threshold of Zone A (Figures 1 and 2). The handler then exits the corridor, allowing the animal to proceed through the test area without further guidance.
4. After the trained handler exits the corridor, a research assistant initiates a 2-minute observation period during which the animal is allowed to enter Zone A voluntarily.
 - └ **If the animal does not enter zone A**, after two minutes, the trained handler re-enters the corridor, approaches the animal and starts encouraging the animal to move forward into Zone A following the steps below. If the step is unsuccessful after 30 seconds, the handler moves onto the next:

Step 1: Use vocalization (i.e., talking to the animal with regular voice volume) and hand gestures (i.e., soft hand clapping).

Step 2: Use gentle tactile stimulation (i.e., touching the animal on the rump).

Step 3: Physically prompt the animal to move into Zone A (i.e., putting your hands on the animal's rump and using consistent forward motion to encourage the animal to move forward into Zone A).

Step 4: If the animal is still unwilling to move forward in the corridor, the trained handler walks it back to its home environment (the novel surface must be removed if the home environment is on the other side of the novel surface).

- └ **If the animal enters Zone A**, the testing assistant initiates a 3-minute timer, records the latency to enter Zone A and the time required for the animal to move from Zone A to Zone C (Figures 1 and 2). The testing assistant also records the time at which the animal enters each test zone (A, B, and C).

NOTE: If any animals slip, becomes agitated, or refuses to move for safety reasons, then the camera manager calls “End test” and notes the event as “End test – safety concern.”

5. The test is concluded when the animal has reached Zone C (all 4 foot in Zone C) or when the 3-minute timer has elapse even if Zone C was not reached.
6. After completing the test, animal that have successfully reached Zone C will be rewarded either with a 20-second interaction time with conspecifics in the reward zone (outdoor corridor) or joining its conspecific in its home pen (indoor corridor).
7. Before testing another animal, the surface must be cleaned, urine and/or feces must be removed, and the floor must be dried.

Safety Note

All personnel should maintain proper distance from test animals to stay safe and not distract them. All personnel should remain calm and avoid sudden movements to prevent startling the animals. Surface of the enclosure should be safe and the gates sturdy enough to withstand unpredictable behaviour of the animals.

AI ASSISTANCE DISCLOSURE

Microsoft 365 Copilot, an AI-based writing and editing tool was used to support language refinement, structural clarity, and consistency of technical descriptions.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

WELL-E Authorship Governance policy, adapted from the Contributor Roles Taxonomy (CRediT) proposed by Brand et al. (2015).

Project Stage	Term	Individual
All Stages (or partial, dependent)	Supervision	Elsa Vasseur Nadège Aigueperse Marjorie Cellier Tania Wolfe Shabnaz Mokhtarnazif
Conceptualization	Conceptualization - Research Area and Project Planning	Elsa Vasseur Abdoulaye B. Diallo Marjorie Cellier Nadège Aigueperse
Conceptualization	Conceptualization and Implementation	Nadège Aigueperse Marjorie Cellier Tania Wolfe Aimee Xu Shabnaz Mokhtarnazif
Conceptualization	Methodology	Nadège Aigueperse Marjorie Cellier Tania Wolfe Aimee Xu Shabnaz Mokhtarnazif
Conceptualization	Funding Acquisition	Elsa Vasseur Abdoulaye B. Diallo
Analysis	Software	N/A
Analysis	Validation	Nadège Aigueperse Marjorie Cellier Tania Wolfe Aimee Xu Shabnaz Mokhtarnazif
Analysis	Formal Analysis	N/A
Writing	Writing -original draft	Shabnaz Mokhtarnazif Tania Wolfe
Writing	Writing -Review and Editing	Elsa Vasseur Abdoulaye B. Diallo Marjorie Cellier Nadège Aigueperse

		Shabnaz Mokhtarnazif Tania Wolfe Aimee Xu
Writing	Visualization	N/A
Services	Resources	Tania Wolfe Shabnaz Mokhtarnazif
Services	Project Administration	Nadège Aigueperse Marjorie Cellier Shabnaz Mokhtarnazif Tania Wolfe
Services/Training	Investigation	Aimee Xu Shabnaz Mokhtarnazif
Services/Training	Data Curation	N/A

* WELL-E authors and co-authors, who take accountability for the manuscript, must contribute to each stage of the paper. These stages are conceptualization/design, data analysis, and writing & editing.