

Table S1a. Mouse behavioral operational classifiers: resident



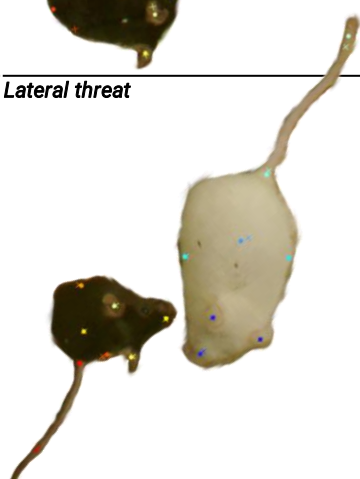


Classifier	Description	Start Frame	Duration of behavior	End Frame
Attack	 <p>Clear physical antagonistic interaction initiated by the Resident mouse. Brief pauses can occur if the Resident mouse remains oriented toward the Intruder.</p>	First frame when the Resident mouse makes physical antagonistic contact with the Intruder. Typically this is characterized by outstretched Resident forepaw(s) contacting the Intruder, while the Resident has an open mouth to initiate a bite. Can also be characterized by the first frame of a slap or quick bite without the forepaws being outstretched.	Short breaks may be present in attack behavior, if Resident is still oriented toward Intruder. Attacks can include tussling, biting, boxing, and corralling as part of the attack bout.	First frame when Resident mouse orients away from Intruder. Typically this is a slight turning of the head to look in a different direction, followed by a relaxation of the body and moving away from the Intruder.
Anogenital sniffing	 <p>Resident mouse is sniffing the anogenital region of the Intruder. Resident must be sniffing at base of tail, not further up on back or on legs.</p>	First frame when the Resident mouse is clearly sniffing anogenital region of Intruder, rather than side, back, or leg.	Uninterrupted sniffing of anogenital region.	First frame when Resident mouse moves head away from anogenital region, either to move away from Intruder or to sniff non-anogenital region.
Lateral threat	 <p>Resident mouse is in proximity (typically less than one body length away from the Intruder) to face of Intruder with back arched and side displayed toward Intruder. Ears are often pinned with shoulder and side of face nearest to Intruder mouse tilted slightly toward ceiling.</p>	First frame when Resident mouse orients side to Intruder and tilts front of body toward Intruder.	Resident will often circle Intruder or move front half side to side in front of Intruder, feigning attacks prior to actual attack.	First frame when lateral threat posture is dropped. Animal will shift head away to look at other target or will begin an attack. If animal does not attack, the back posture will relax.
Pursuit	 <p>Resident mouse is following in the Intruders path as the Intruder moves away from the Resident.</p>	First frame when the Resident is moving toward Intruder as Intruder moves away. Typically this is characterized by the Intruder running away after an attack ends and the Resident follows directly after, or when the Intruder walks past the Resident and the Resident markedly changes directions to pursue the Intruder in the Intruders path.	The Intruder is specifically moving away from the Resident. The Intruder is not sniffing the arena, foraging, etc. Intruder typically moves in a straight line until it reaches the edge of the area, at which point it will turn to face and watch the Resident. Resident is moving along the same path as the Intruder without sniffing or foraging in the arena.	First frame when either mouse stops moving, or the Resident deviates from path of the Intruder.
Tail rattle	 <p>Resident's tail is curved at two or more points (typically in an "S" shape) and showing rapid back and forth movement.</p>	Defined as rapid back and forth movement of tail. In Resident mice this manifests as curling of tail into "S" shape, where next frames show inversion of shape and rapid whipping back and forth of the tail.	The tail continues to move rapidly back and forth and can occasionally straighten if tail is moving fast enough. Tail side to side movement is continuous.	First frame when the curled side to side movement of the tail stops. The tail typically relaxes and straightens out.

Table S1b. Mouse behavioral operational classifiers: intruder



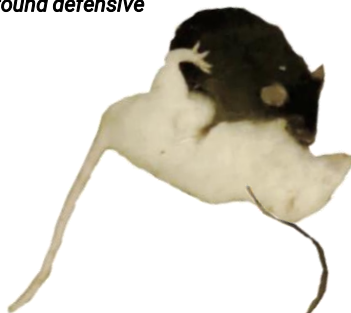
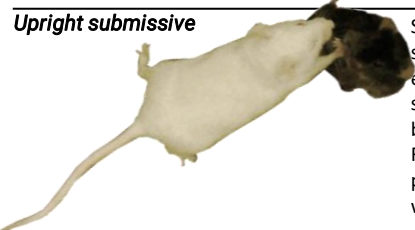



Classifier	Description	Start Frame	Duration of behavior	End Frame
Flee 	Running away from Resident. This is distinct from fleeing because Subject is actively moving across cage, most typically in a straight line away from Resident.	First frame in which subject elongates to move away from the Resident.	Subject is moving away from Resident in fast and directed manner.	Subject deviates to face Resident, alters course in a wandering manner, or slows down or stops.
Upright defensive (box) 	Standing on hind legs with forepaws often touching Resident, can display intermittent pushing and defensive biting. Subject is not instigating aggression.	First frame in which subject is standing on back legs AND has paws touching Resident or bites.	Subject remains standing on hind legs slapping, pushing, or demonstrating lunging bites at resident.	Subject either moves into upright submissive pose or forepaws touch the ground.
Ground defensive 	Subject is on back or side on the ground actively fighting back against Resident (biting, pushing). Often this occurs after Subject is boxing and then loses balance or is pushed over onto back.	First frame in which Subject is on back or side on the ground and is engaged in a tussle with Resident. Subject is either biting or pushing the Resident.	Subject continues to fight back against Resident.	Subject either shifts to scrambling, ground submissive, fleeing. Resident can also stop attacking. Attention of Subject shifts from fighting back to either protecting itself more passively (shifting to protect organs) or to getting away from Resident.
Upright submissive 	Standing on hind legs with stomach exposed, forepaws extended or up in the air, and subject is often leaning backwards away from Resident slightly. Is not pushing or actively engaging with Resident.	First frame in which subject is standing on back legs with front paws outstretched and has stomach exposed.	Subject remains standing on hind legs with forepaws stretched out and stomach exposed. Often is quite still.	Subject either moves into upright defensive boxing or forepaws touch the ground.
Ground submissive 	On back or side fully on the ground with stomach exposed. Subject is not biting or pushing Resident. May jerk forward to try to protect stomach but is not engaging aggressively with Resident.	First frame in which Subject has back or side on ground exposing stomach to Resident.	Subject remains on ground with stomach exposed, may be rolling between side and back. This is not the same as a tussle in which the animal loses balance and is pinned by Resident but is trying to right itself.	Subject rights itself or otherwise stops displaying stomach to Resident from the ground.
Scrambling 	Subject is attempting to get away from Resident but is cornered or pinned. Can be in any position (ground, standing, all fours), but this is delineated from other classifiers because animal's head is often pointed away from Resident and the Subject is clearly scrambling with its paws to try to pull itself away from the Resident.	First frame in which Subject is attempting to get away from Resident. Different than fleeing because is not yet moving away from Resident and Subject often has to make several attempts to get around/away from Resident.	Subject continues to attempt to escape instead of becoming defensive or submissive.	Subject is either successful and flees, or shifts to other behavior. Often shifts to ground defensive.
Sentry 	Standing or crouching, typically fairly immobile and watching Resident. Can be in any proximity to Resident, but attention is clearly on Resident. Subject is not sniffing air or exhibiting exploratory behavior.	First frame in which Subject assumes crouch or standing position and is watching Resident.	Subject is mostly immobile (may move head to track Resident or shift from crouch to standing)	Subject returns all four paws to ground, shifts attention away from Resident

Table S1c. Rat behavioral operational classifiers






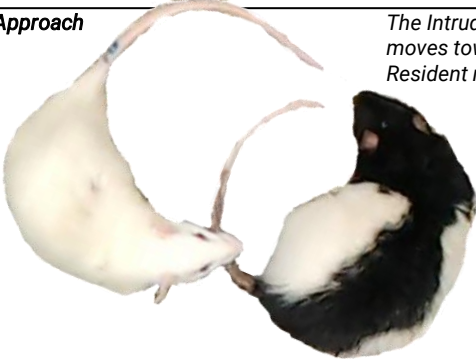

Classifier	Description	Start Frame	Duration of behavior	End Frame
 Attack	<p>Clear physical antagonistic interaction initiated by the Resident rat. Pauses in movement can occur if the Resident rat remains oriented or moving toward the Intruder.</p>	<p>First frame when the Resident rat makes movement towards the Intruder that ends in a physical attack. A physical attack is typically characterized by outstretched Resident forepaw(s) contacting the Intruder, while the Resident has an open mouth to initiate a bite. Can also be characterized by a quick threatening movement resulting in the rearing up of both rats.</p>	<p>Attacks can include tussling, biting, pinning, boxing, and corralling as part of the attack bout. Breaks in movement may be present in attack behavior. This typically occurs after boxing where both rats are reared up and Resident is oriented towards the Intruder. Breaks in movement can also occur when the Resident has the Intruder pinned in a submissive posture.</p>	<p>First frame when Resident rat orients away from Intruder. Typically this is a slight turning of the head to look in a different direction, followed by a relaxation of the body and moving away from the Intruder.</p>
 Submission	<p>The Intruder rat is in a supine posture and is pinned down by the Resident rat. The Intruder can be pinned in a corner or against a wall, but the back of the Intruder close-to horizontal with the bottom of the cage.</p>	<p>First frame when the Intruder rat assumes a supine posture and continuous to be pinned down for at least 1 second.</p>	<p>Struggling usually occurs at the beginning of the submissive posture and is typically followed by breaks in movement with the Resident rat still on top of the Intruder. More bouts of struggling typically happen, and in some cases, may result in the moving of the interaction to a different location during which a submissive posture is still assumed by the Intruder.</p>	<p>First frame when the Intruder rat is no longer in a supine position. Typically characterized by moving upright onto its hind paws or on its side.</p>
 Lateral threat	<p>Resident rat is in proximity (typically less than one body length away from the Intruder) to face of Intruder with back arched and side displayed toward Intruder. Ears are often pinned with shoulder and side of face nearest to Intruder rat tilted slightly toward ceiling.</p>	<p>First frame when Resident rat initiates the movement to orient towards the side of the Intruder, arches back, and tilts front of body toward Intruder.</p>	<p>Resident will often move toward the Intruder or move front half side to side in front of Intruder, feigning attacks prior to actual attack. Can also occur without initiation of an attack upon approach of the Intruder rat as a defensive behavior.</p>	<p>First frame when lateral threat posture is dropped. Animal will shift head away to look at other target or will begin an attack. If animal does not attack, the back posture will relax. Can occur by the Intruder rat increasing proximity to Resident.</p>
 Anogenital sniffing	<p>Either rat is sniffing the anogenital region of the other. The rat must be sniffing around the base of tail rather than the back or legs.</p>	<p>First frame when either rat is clearly sniffing the other's anogenital region near the base of the tail. In addition to what is pictured, anogenital sniffing can occur when one rat approaches from the front or side and crawls under the other to investigate.</p>	<p>Uninterrupted sniffing of anogenital region.</p>	<p>First frame when the rat moves head away from anogenital region, usually either to move away from Intruder or sniff non-anogenital region.</p>

Table S1c continued. Rat behavioral operational classifiers

Classifier		Description	Start Frame	Duration of behavior	End Frame
Boxing		The Resident rat and Intruder rat stand on their hind legs in close proximity while pushing and/or grabbing at each other with their front limbs.	First frame when both rats are completely reared up with the hind limbs supporting their weight (as opposed to pushed up against the side of the arena).	A bout of boxing must include contact between the upper, limbs of the rats, whether its pushing and grabbing or light physical contact. This typically occurs within or at the end of an attack bout.	First frame when either rat is no longer fully upright or one rat initiates a movement to return to walking on four limbs, usually moving away from the other.
Approach		The Intruder rat moves towards the Resident rat.	First frame when the Intruder rat initiates a movement towards the Resident rat, or changes direction towards the resident while in the middle of a movement.	The Intruder rat may be moving towards the Resident rat slowly or quickly. There may be pauses in movement if the Intruder rat is moving cautiously with its head directed at the Resident rat.	First frame when the Intruder rat has either stopped moving towards the Resident rat, or makes physical/olfactory contact with the Resident.
Avoidance		The Intruder rat moves away from the resident rat.	First frame when the Intruder rat initiates a movement away from the current or anticipated position of the Resident rat. Often follows lateral threat, submissive, or boxing behavior.	The Intruder rat is moving away from the Resident rat in a continuous movement.	First frame when the Intruder rat ceases its movement away from the Resident rat, is attacked, or reaches maximal distance from the resident (in the case of a long circling movement).