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De biologie van het scheiden van dieren

The biology of weaning in animals

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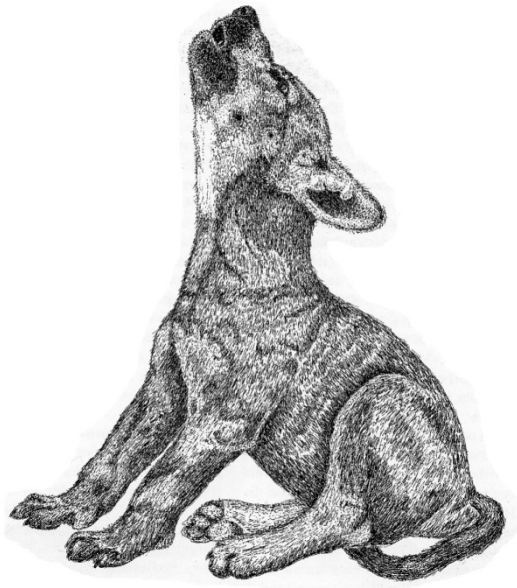

The biology of weaning

What?

- end of lactation; in practice often the process of social and spatial separation of offspring from the primary caregiver (mostly = mother).

Why?

- What is the biological reason for weaning?

How?

- How does the process takes place? What are the social mechanisms and how are they structured?

When?

- What is the appropriate time point or phase?

Why?

What is the biological reason for weaning?

Genes

- Biologically it is useful for a species to optimally make use of successful genes and to avoid inbreeding.

Resources

- Environmental resources are limited. The number of individuals within a distinct area/territory has to be regulated.

Social structure

- Whether and how (consequently) weaning takes place depends on the social structure. Social stability has to be guaranteed.

How?

How does the process takes place?

- Development of physical independence.
- Development of cognitive-emotional adulthood.
- Development of social adulthood.

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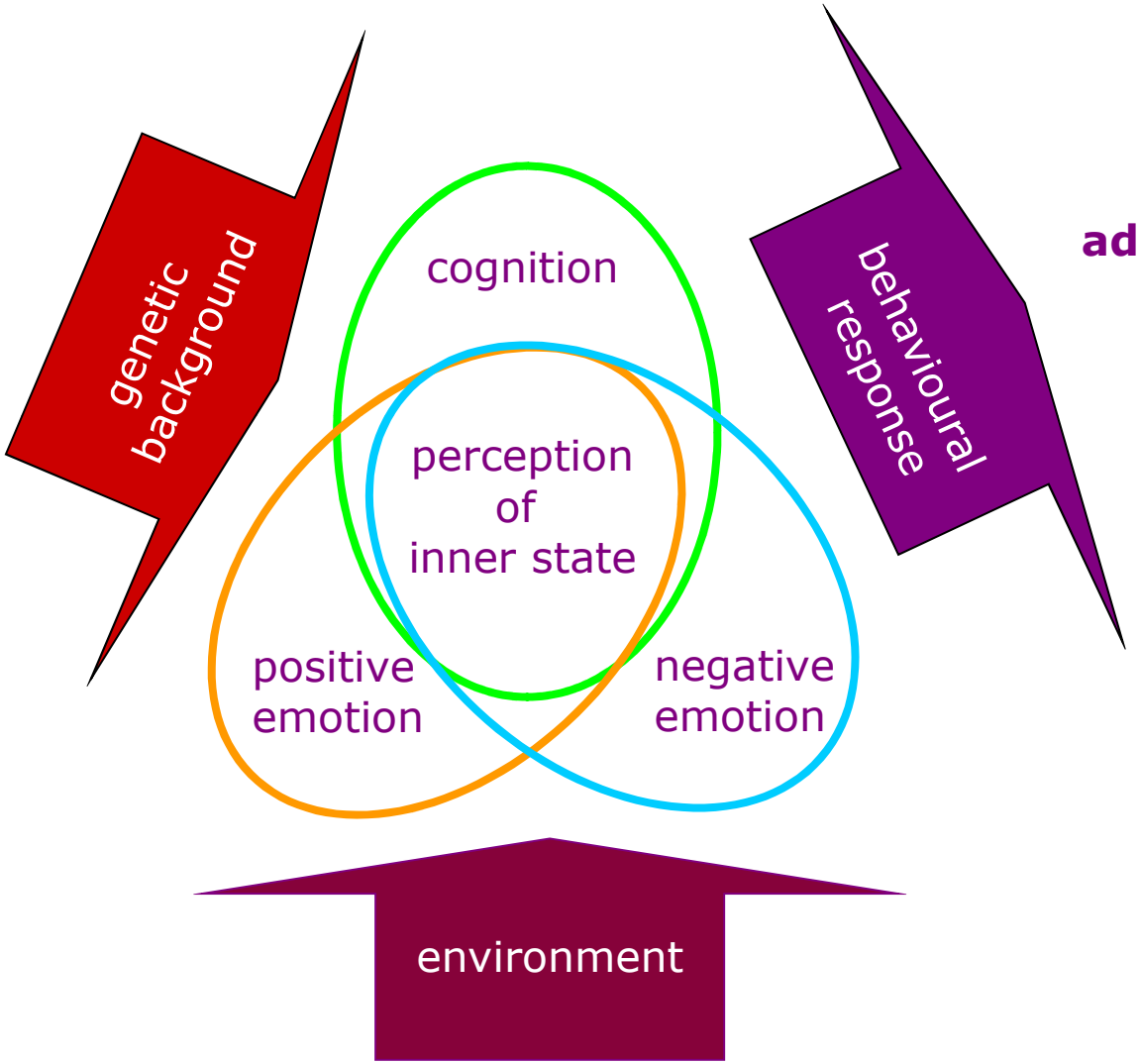
How?

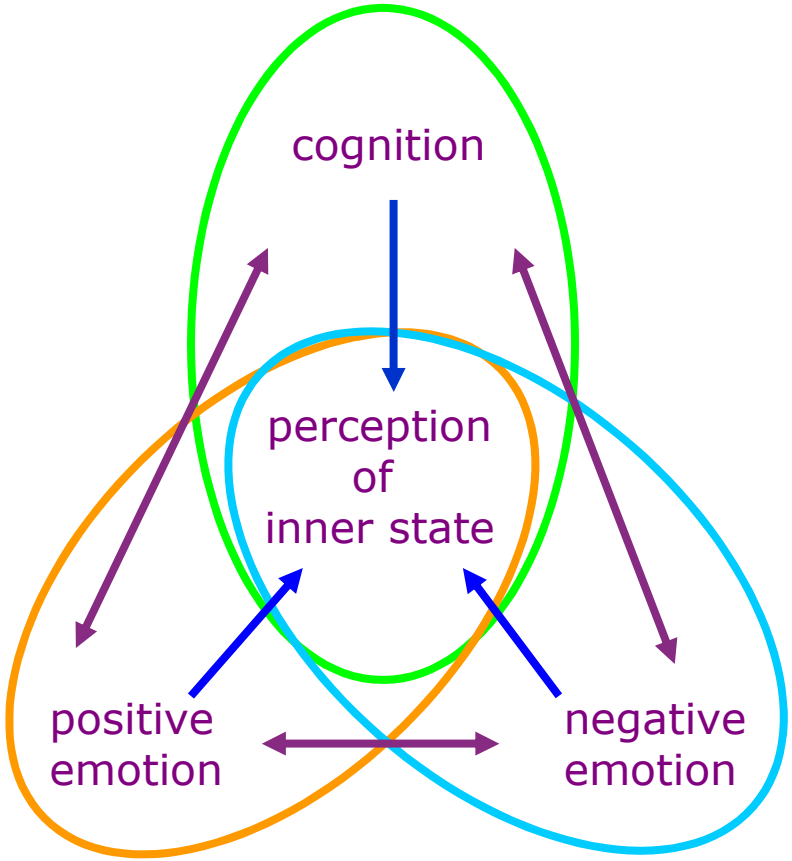
How does the process takes place?



adaptive/non-adaptive

How?

How does the process takes place?



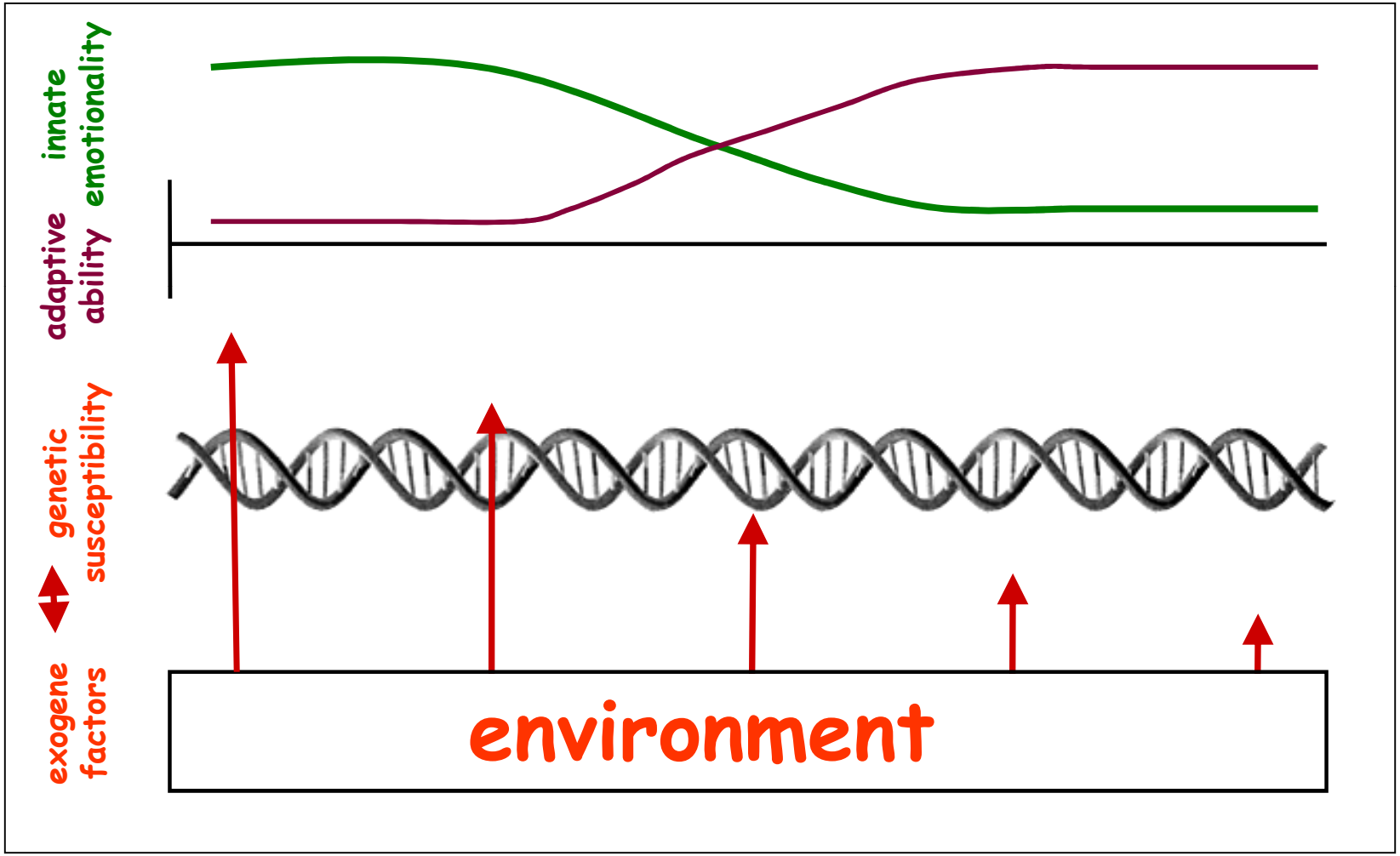
behavioural level

CNS-level

How?

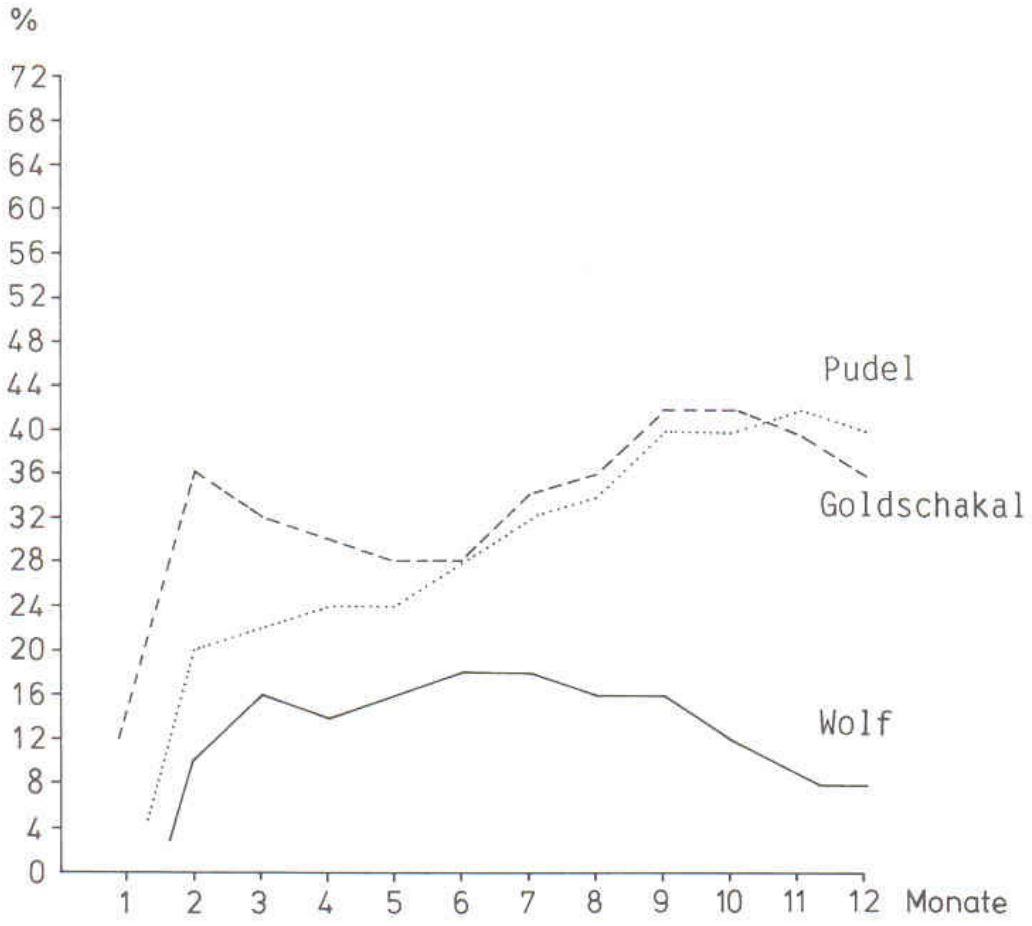
How does the process takes place?

Genetic predisposition and environmental factors are risk factors for the development of non-adaptive behaviour.



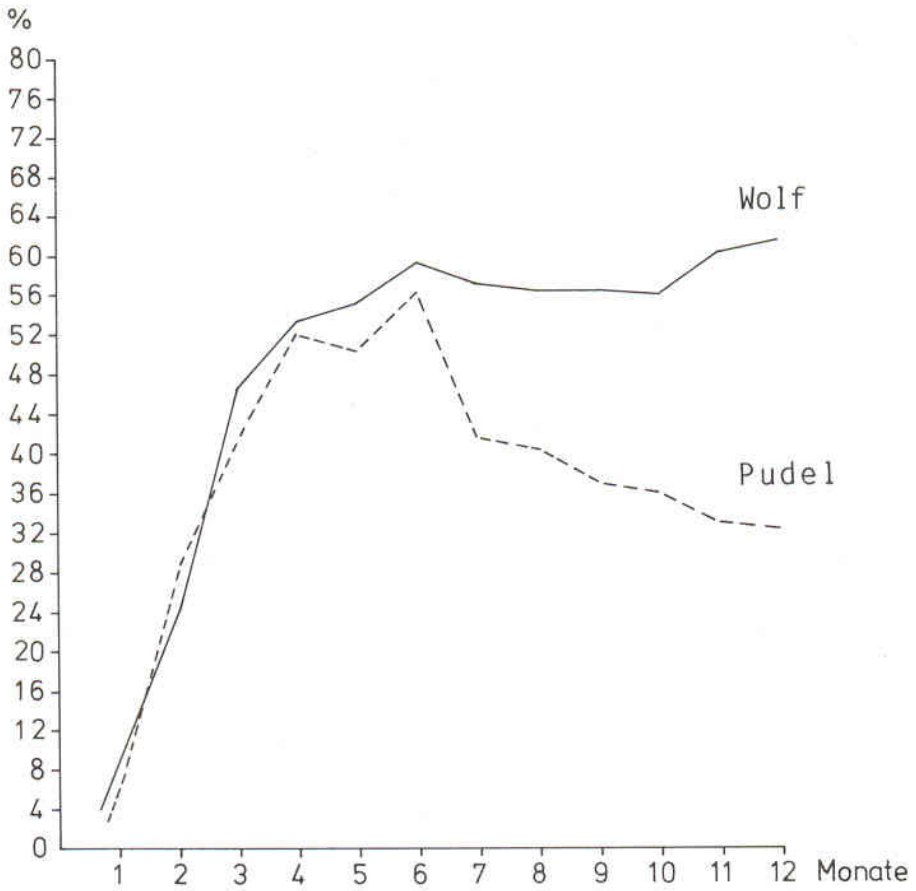
Genetic background…

Development of agonistic behaviour in wolves, jackals and dogs.



Genetic background…

Development of play behaviour in wolves and dogs.

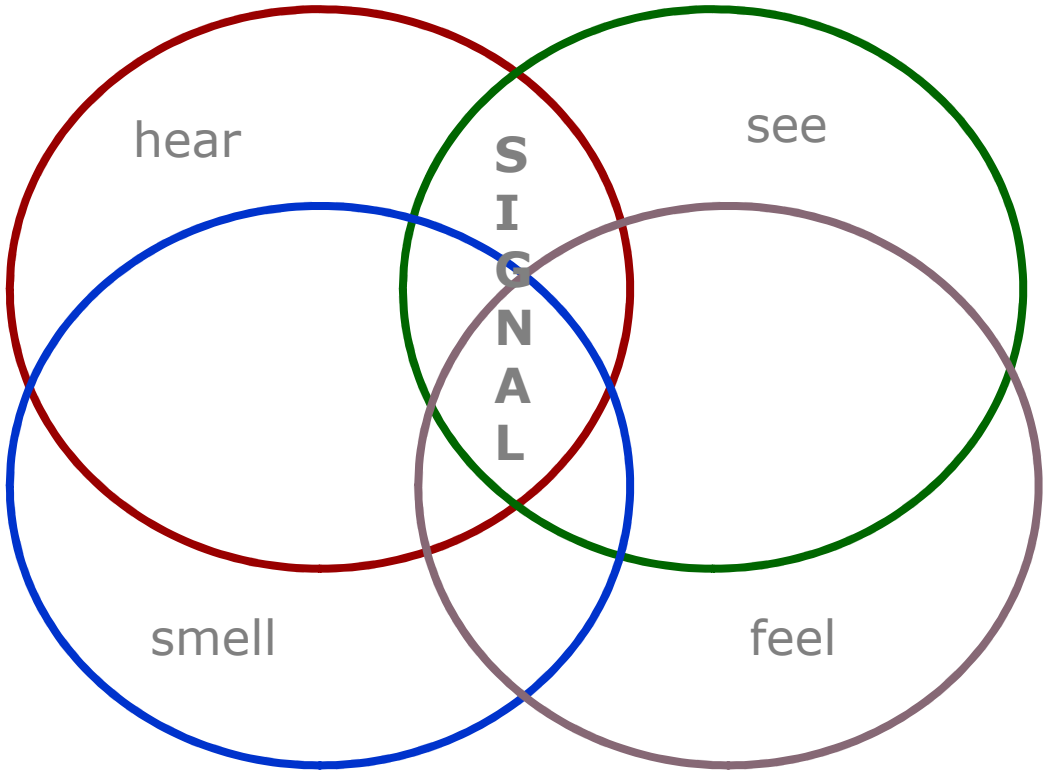


Physical environment…

Learning needs stimulation!

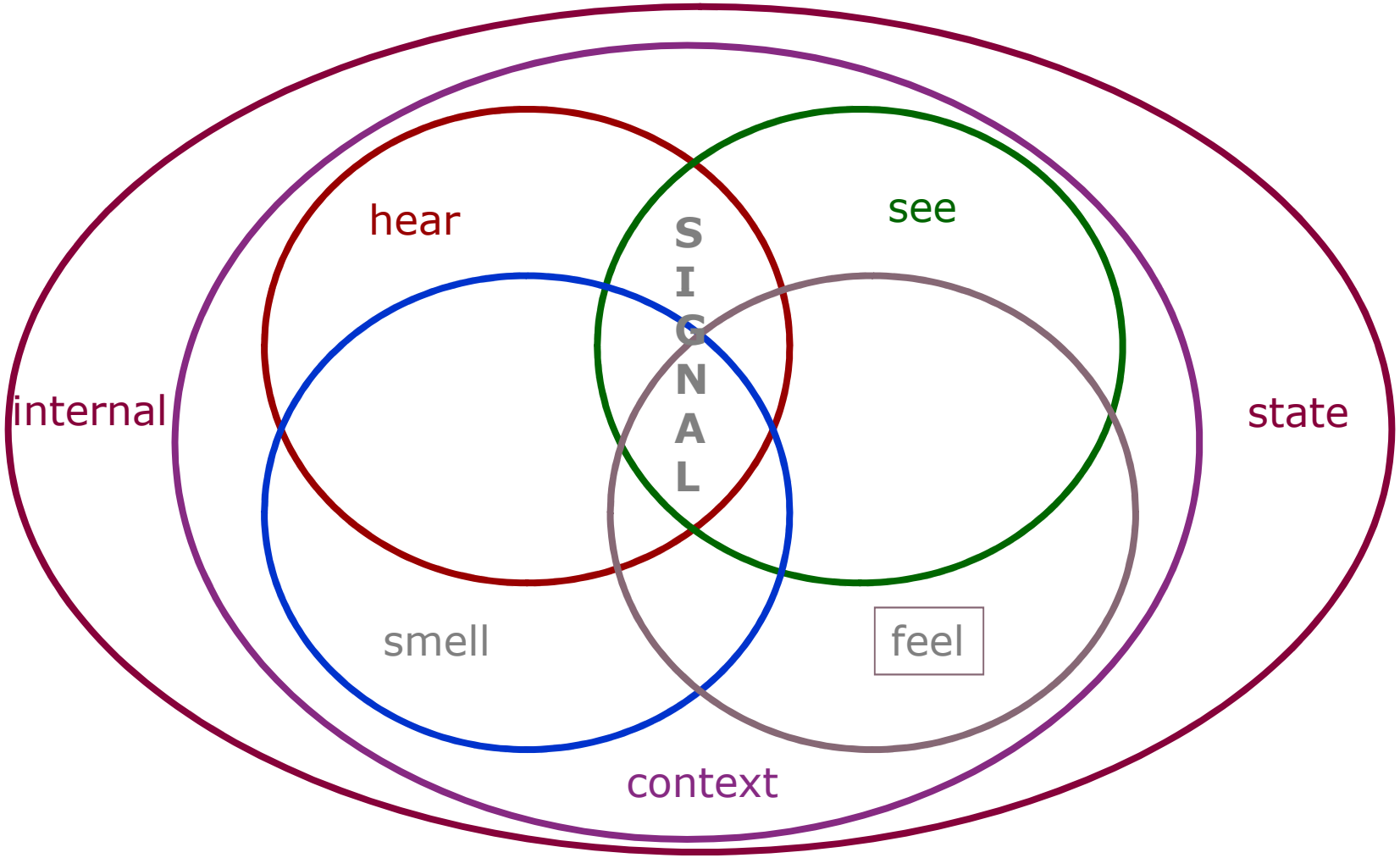
Social environment…

Communication: developing and learning about signals



Social environment…

Communication: developing and learning about context



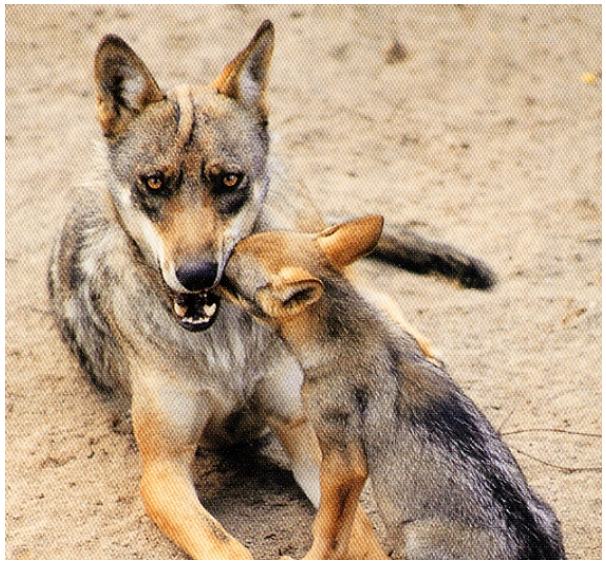
The primary caregiver…

Almost no limits within early developmental phase.

The primary caregiver…

Licking behaviour as signal to confirm binding and begging for food.

The primary caregiver…



Socio-positive interaction: careful biting and holding the snout is often used as (dominant) signal to confirm social binding and setting limits.

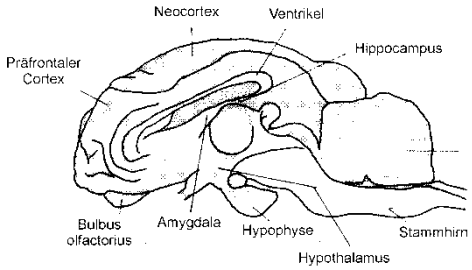
How?

What are the (social) mechanisms and how are they structured?

- central nervous development allows for max. information storage = learning.

- physical environment becomes more complex (larger activity area).

- social environment becomes more complex (more social partners, social feedback more differential)

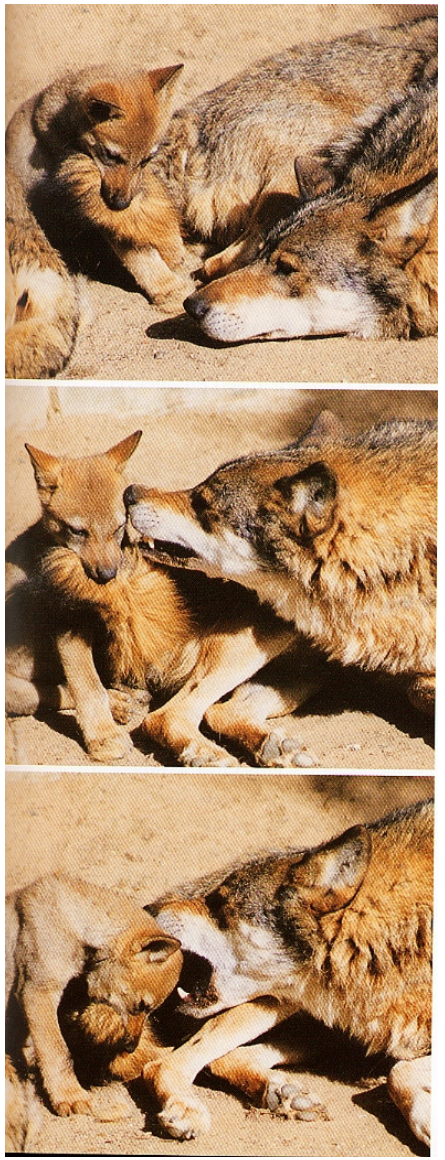


It depends on the context….

Signals are not wrong or right, they are adequate or inadequate, depending on the context.
Social development, based on communication, depends on giving the right signals within the right context.

Negative social feedback…

Learning about limits:
Although wolf-pups are allowed to train behaviour in almost any way, limits are set already in an early state of development.



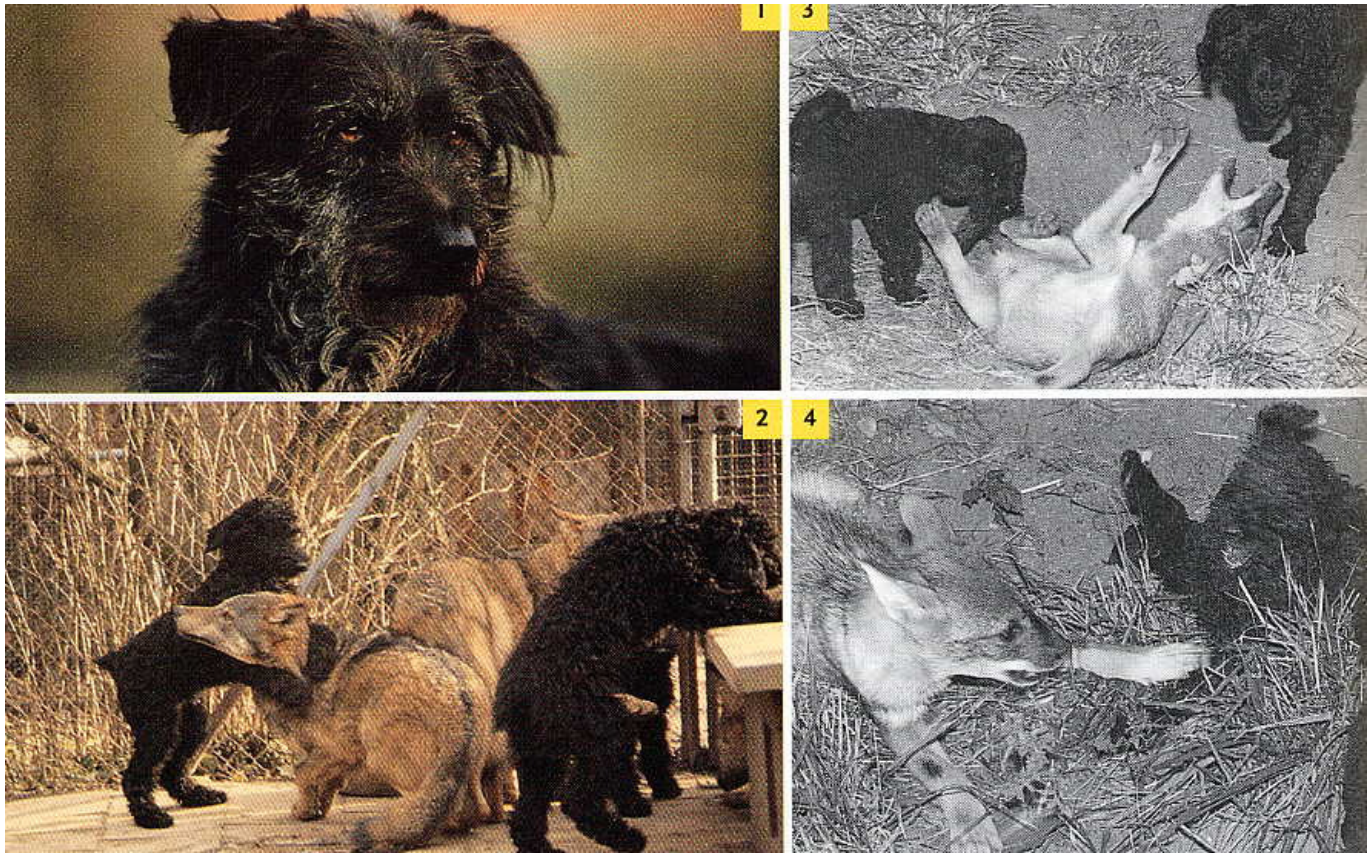
Playfully learning about limits

Social (playful) interaction between American Staffordshire: over-expression of signals by the mother as invitation to the pups; playful aggressive interaction between pups.

Playfully learning about limits

Play-fighting for an object…

Playfully learning about limits



Wopu (F1). Social play between juvenile poodles and wolves / coyotes.

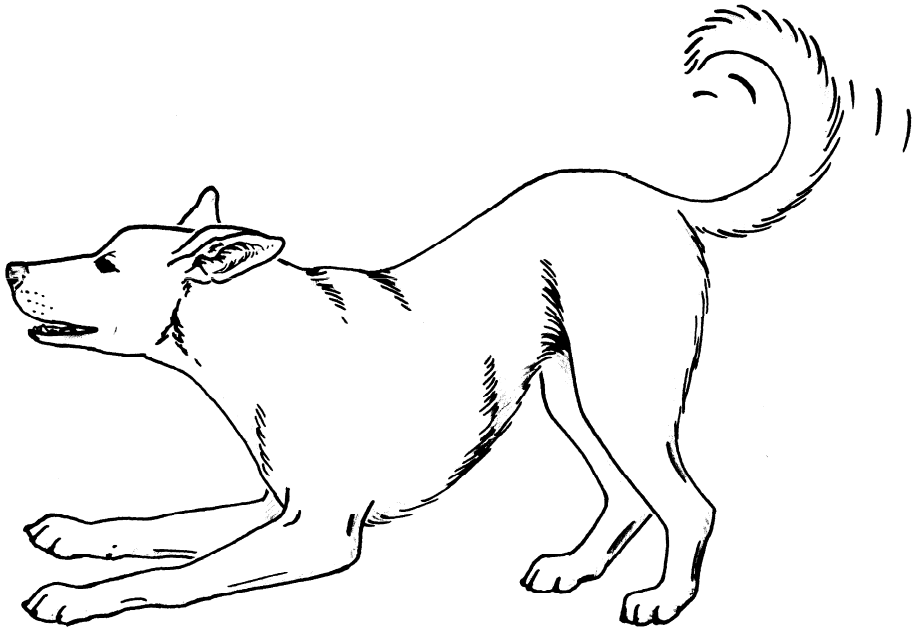
It depends on the context….

Adequate context:

- approach of conspecific
- neutral/friendly approach of dominant

Inadequate context:

- offensive approach of dominant social partner



Invitation for playing: upright-down posture.

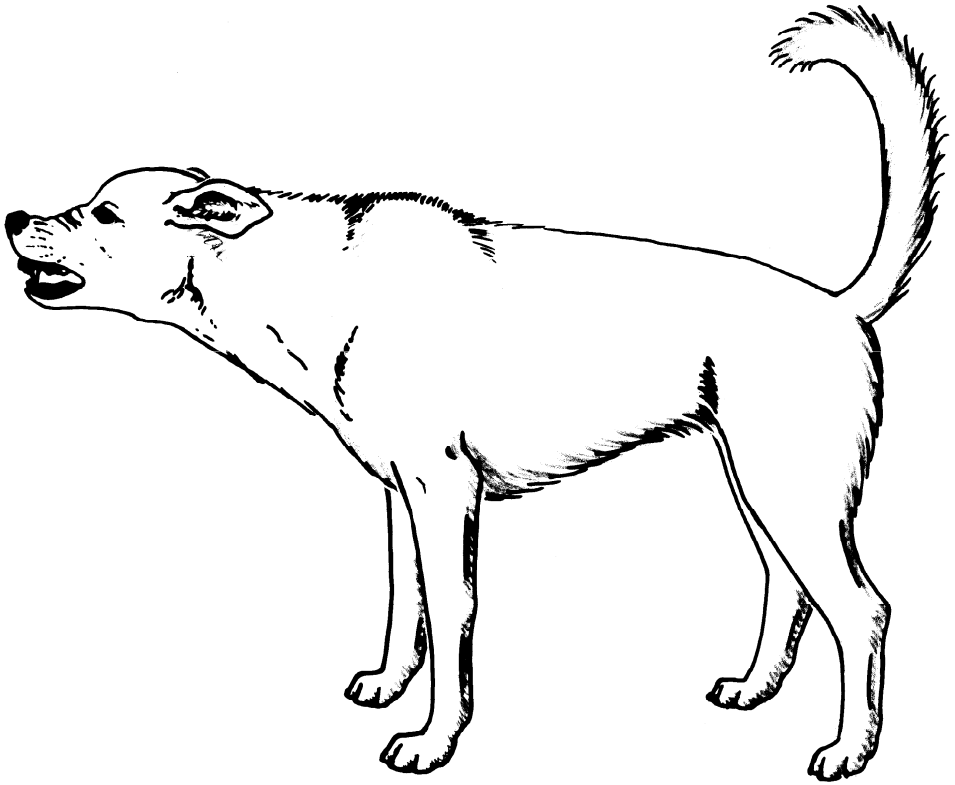
It depends on the context….

Adequate context:

- aggressive approach of unfamiliar individual
- maintained display posture of conspecific
- defending resources against non-dominant - continued

Inadequate context:

- friendly approach
- social partner



Offensive threat. Overall size maximised, tail raised, ears turned back, showing teeth, nose upwards

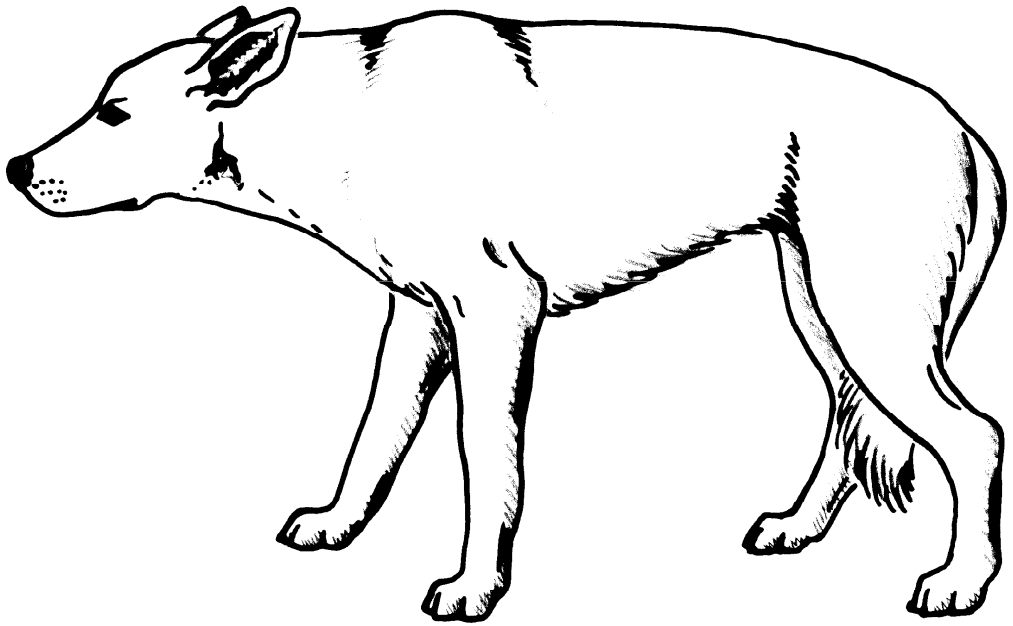
It depends on the context….

Adequate context:

- potential threat
- offensive approach of dominant

Inadequate context:

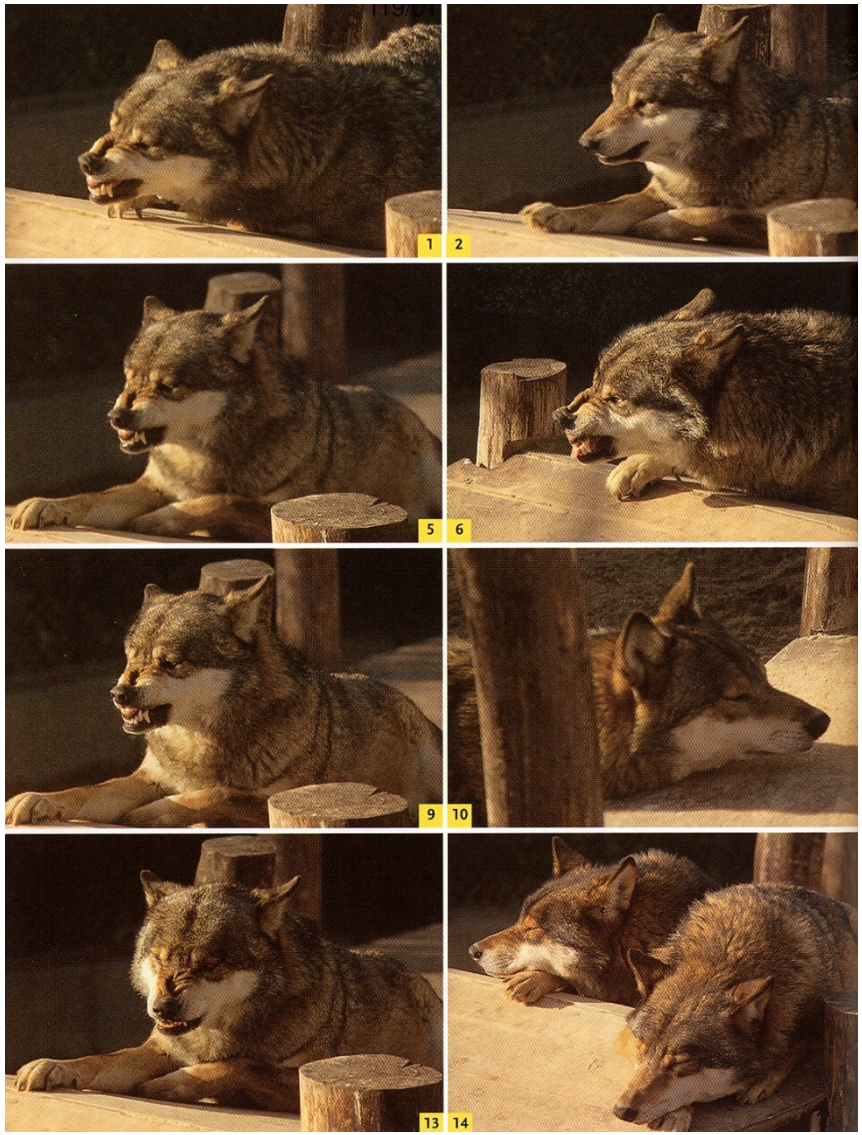
- socio-positive approach of social partners
- familiar external signals



Submissive/anxious: Reduced overall size, ears directed backwards, tail turned down.

Differential communication avoids aggression

Extensive ritualistic threatening behaviour of a dominant in response to the approach of a younger one: without aggressive interaction an agreement is found.



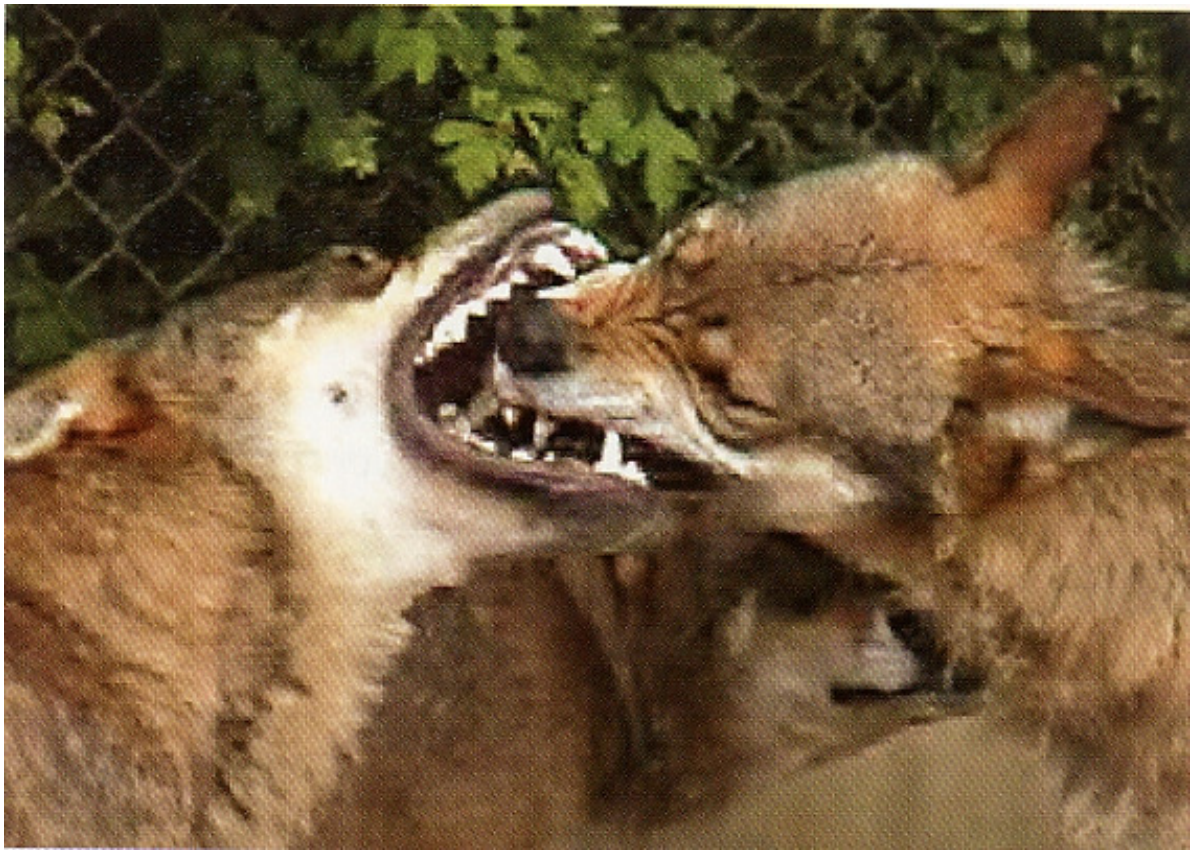
Submission: avoiding aggression

Submissive-defensive approach (left) towards a dominant (right). The threatening behaviour of the dominant is highly ritualistic but sufficient to regulate the careful challenge of the younger one.

Defensive threatening

Defensive threatening (with playful components) to defend a resource.

Submission: avoiding aggression



Appeasement – details make the difference.

Learning about the context….

- social preferences and mechanisms are primed during the socially sensitive phase.

- time point and duration of sensitive phases are species (strain/breed) specific.

- social learning continues throughout life.

- Dogs: sensitive phase between 3 and 20 weeks of age (peak at about 7 weeks).

When?

What is the appropriate time point or phase?

- end of lactation
- physical independence
- the more complex the social system, the longer the phase of 'social weaning'
- social independence

When?

What is the appropriate time point or phase?

- experiences during development modulate central nervous dynamics (cognitive-emotional set-points/reactivity)

- novel stimuli are less 'threatening' within a safe environment (lower threshold to approach)

- ability to learn does not end with sensitive phase

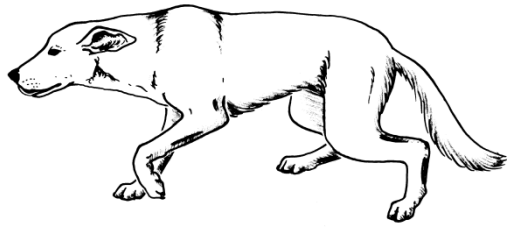
- response to stimuli in later life does highly depend on behavioural repertoire

- during the sensitive phase sensitivity is not only increased for positive but as well for negative input (e.g. trauma)

When?

What is the appropriate time point or phase?

- weaning is a gradual process
- graduation allows the organisms to adapt to changes
- graduations avoids exceeding the individuals' adaptive capacity
- exceeding adaptive capacities (trauma) can result in long lasting and even pathological changes



When?

What is the appropriate time point or phase?

- example: maternal deprivation in mice and rats

  - ❑ increased anxiety
  - ❑ increased territorial aggression
  - ❑ higher stress-reactivity
  - ❑ reduced maternal behaviour

  - ❑ related central nervous changes

When?

What is the appropriate time point or phase?

- example: early weaning in dogs

  ❑ to be assumed: same risks as in mice and rats
  ❑ inadequate behavioural responses towards unknown social partners (especially lack of submissive behaviour)

When?

What is the appropriate time point or phase?

• special demand in companion animals: other species as social partner

- ❑ socialization with humans
- ❑ highly flexible interaction with different breeds of own species
- ❑ other animal species
- ❑ extremely varying physical environment

Risks of early weaning in social companion animals

• sudden disruption of social bindings and disappearance of safe environment can be traumatic

• shift from biological process of detachment can be counteracted by human attention and care – hyper-attachment

• development of food-hierarchy can be counteracted by human feeding-scheme (e.g. hand feeding) – disruption of hierarchization

• anthropomorphic delay in order-obediance (context learning of submissive behaviour) – inadequate social behaviour, sociopathy

• lack of stable social relation (changing social partners, being left alone) can result in behavioural dysfunctions

Recommendations for weaning in social companion animals

- do not disrupt the biological process of weaning
- enrich the physical and social environment during early development as much as possible
- allow for adaptation (learning takes time; stimulate but do not force)
- if a shift in social environment is unavoidable before natural weaning is completed, follow the natural process as closely as possible

Thanks to…

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Hundepsychologie, 1989
Hunde und ihre Menschen, 1992
Hundepsychologie, 2004