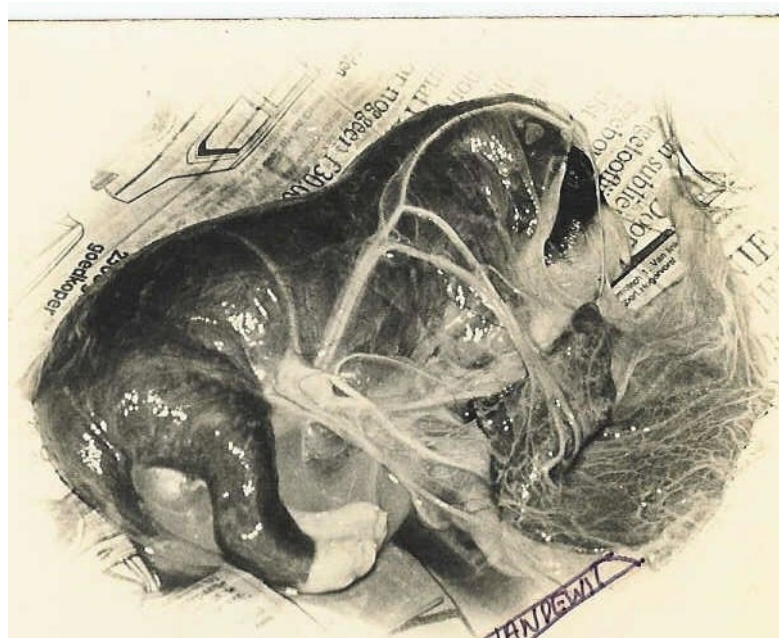


CANINE – ETHOLOGY

the neonatal influence on dogbehavior

by

MR. JAN DE WIT



Introduction

In 1983 Mr. Jan de Wit graduated of Biology at the Amsterdam University (VU) on the thesis: "Kynethology - a Research on Behavioral Development of the dog". (ISRA reg.nr. 3762)
He scientifically proved that newborn puppies undergo an olfactorial influence of has such an impact that a single stimulus is recognised after 5 and 7 weeks.

In 1985 he sublimated his findings in a series of articles that were published in the leading dogmagazine in Holland: Our Dog (Onze Hond).

From 1981 until 1985 he worked as a dogpsychologist at the leading dog resocialization centre in Holland (Martin Gaus), were he also gave lectures for veterinary students, breedclubs and dogowners on behavioral subjects.

He is head-editor on behavioral subjects of the main dogencyclopaedia in Holland: "Toepoels Dogencyclopaedia".

He gave many lectures in Holland as well as U.K., Belgium and Germany for breedclubs, caninesocieties and other interested people.

He is now a Principal of a Highschool.
He finished his Masters' degree in Psychology in 2006.



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ARTICLE # 1: Puppy Socialization and Habituation

For shortly this article was published at the APBC site (UK): <http://www.apbc.org.uk/>
The focus of this essay is now published in *the APBC book of Companion Animal Behaviour* by David Appleby (2004), as quoted in a review: "The emotional development of the dog and resultant behavior is covered in a ground-breaking essay that will change the accepted view of these things for-ever."

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Summary:

CANINE - ETHOLOGY

the development of neonatal dog behavior - THE RESEARCH

The thorough scientific research as published by Scott and Fuller in 1965 was focused on the early demonstration of possible genetic varieties with pups at the age of 0-16 weeks.

The results as recorded by them, became the basic for further research on dog behavior and thus may be known.

Scott and Fuller as well as later behaviorists agreed upon that the pup could hardly show any relevant essential behavior during the first three weeks of its life, because of the absence of the working senses.

Eyes and ears are still closed, and so they also excluded the olfactory sense.

They based these statements on an earlier myelination test. Later research established that their anatomical and physiological knowledge is dated and that they most likely based themselves open the investigation of the wrong nerve.

In their own work 'Dog Behavior - the Genetic Basis' (1965) prove is given of the existence of a discrimination ability by young pups with eyes and ears still closed on a "for a dog strong-smelling expedient resembling citronella oil"... "but they will lick at a glass bar dipped in fish or meat gravy".(page 86).

The main objection is however that pup behavior is not related by them to its early development stage, it was referred to as fully developed adult behavior.

It gave me enough reasons to be critical of their work as a basis for behavioral development and to assume that olfactory ability is present in an earlier stage than supposed.

In 1983 I finished my Biology studies with a research on the development of neonatal behavior in dog puppies.

The stated hypothesis was: offering a scent-imprint to a newborn pup give a recognition of this imprint at a later age.

An opportunity to investigate the assumptions and findings with kennel breeders had to be abandoned because of the variability in methods of breeding and conditions.

The CPB-TNO (Central Institute for the breeding of laboratory animals - the main institute in Holland) gave full co-operation and thus the opportunity was presented to obtain the best possible method in gathering **objective data**.

The **method** was a double-blind-system scent offering procedure.

As soon as the pups were born, they were offered (blindfolded) a scent, that would be able to be recognized at a later stadium. For the method of testing the Campbell Test had been chosen, which is strictly subscribed for to be tested at 7 weeks. However I found that between 5 and 7 weeks pups learn a great deal of the basis of their later social behavior and therefore I wanted to test a group at 5 weeks and a group at 7 weeks. In the Campbell test the pups must, among others things, come forwards to a person, therefore the smell had to be a human one.

The finest results would be obtained by offering one small dose, so a period of 30 seconds under the armpit of the future tester (an "overdose") was chosen.

For the matter of a control-group, the "split-litter-method" was decided upon, by which half the litter was functioning as an experimental group (got scent stimulus) and the other half as a control-group. After the stimulus, the Experiment group was placed back with their mother and littermates.

In doing so, identical breeding conditions were guaranteed.

The assistant knew when the pups were due and saw to it that the litter was divided, the exterior characteristics of the treated pup were laid down in sketches intended for this purpose and the pups were photographed as well, to prevent later errors.

In total 102 pups were involved, at testing time 47 were left, due to mortality or absence.

Just before my testing time another Biologist Drs.J.H. Frijlink had tested more than a 1000 pups of the same population of Beagles with the same test under the same conditions, in order to obtain data about the development of evasive-/flight behavior at various ages. There were no restrictions for not using these test results as a blind Control group.

Thus the Control group could be extended to 344 pups.

Methods of Measuring

The quantities, usually measured at imprinting are:

- approaching
- following
- nestling / looking for support

The test in which these items are included, has been developed and described by William Campbell. The test is primary meant to give a picture of the basically agonistic behavior of the pup. In other words: whether a pup is extremely fearful or aggressive.

The test ultimately carried out, was a translation which I adapted later to become more readable.

The test consists of 5 separate sub-tests, upon which may be scored separately:

1. approaching (an imprinting quantity)

2. **holding on the back (a socialization quantity)**
3. **following (imprinting)**
4. **stroking (socialization)**
5. **holding from the ground (socialization)**

Scoring was given in a range from 0 to 4, depending if a pup is rigid or takes flight (scoring a 0) up to an enthusiastic towards humans open pup (scoring a 4). The scoring variations are only objective measurable by a well-trained tester.

Campbell summarizes the sub-tests to give a total view of the pup's basic behavior.

For some reasons this is not advisable: as imprinting (as a non-learning process, but probably a physiological change in the limbic system / riencephalon and the amygdala) and socialization (a learning process) differ so extremely, it is not advisable to add the results of the different sub-tests together.

It is however possible to summarize the separate imprinting and socialization sub-tests.

Results

It is beyond this summary to give all the test results.

Colleagues/friends at the University of Groningen (faculty of Mathematics) have checked and sublimated the test results in several ways.

No significant variations (differences) were noted in the test results of the Experimental group and the related Control group.

Based on these data, the 0-hypothesis should be accepted (no influence of scent).

No significant variations (differences) were noted in the test results at 5 weeks and 7 weeks of the Control group and the related Frijlink group

Thus the relating Frijlink group could serve as a blind-control-group.

At comparing the test data of the Experimental group and the relating Frijlink group (as a blind-control-group) the imprinting-units appear to be scoring in utterly significant way.

At the same time there is a significant variation in the socialization sub-tests, corresponding with data of Fox and Stelzner (1966), about a quicker way of socializing of pups that were raised by hand or had been with man from birth on.

Based on these data the 0-hypothesis should be rejected.

Discussion

The reason why the Control group did not score significantly different was an obvious one: the pups had probably taken some scent back to the nest, where they were replaced, thus giving the "control group" a scent-imprint as well.

Later visit at a laboratory where the pups were fully isolated from human influence for the first three weeks (as from the known literature, behavioral development was then supposed to start), and later contact with breeders, confirmed these suppositions.

Summarized:

Pups are available to take up scent from the moment of birth and recognize it when it is presented 5 weeks later. An impact of that kind we only know by the term of Imprinting.

This has numerous implications:

1. As **imprinting takes places at birth** the Scheme of Development of Dog behavior had to be rewritten, as done by myself (next article).
2. Breeders have to be involved with the development of pups behavior towards man, from the moment that the litter is born.
3. Breeders can be held responsible if deprivation behavior is due to lack of socialization during the first weeks at the breeder's place.

The test that was used - now transformed to the **Socialization Test** - has proven to be useful for breeders and breed clubs to get an image of the pup's basic behavior. Not as a stigma how it will become in future, but as a "direction of use" how a pup should be treated to avoid undesirable behavior.

Or as stated: *early plasticity affords greater adaptability.*

During this last 15 years I have noticed that a greater knowledge and awareness of this true development of neonatal behavior has referred to more preventive means to maintain what a dog is for over a 15.000 years: **MAN'S BEST FRIEND**

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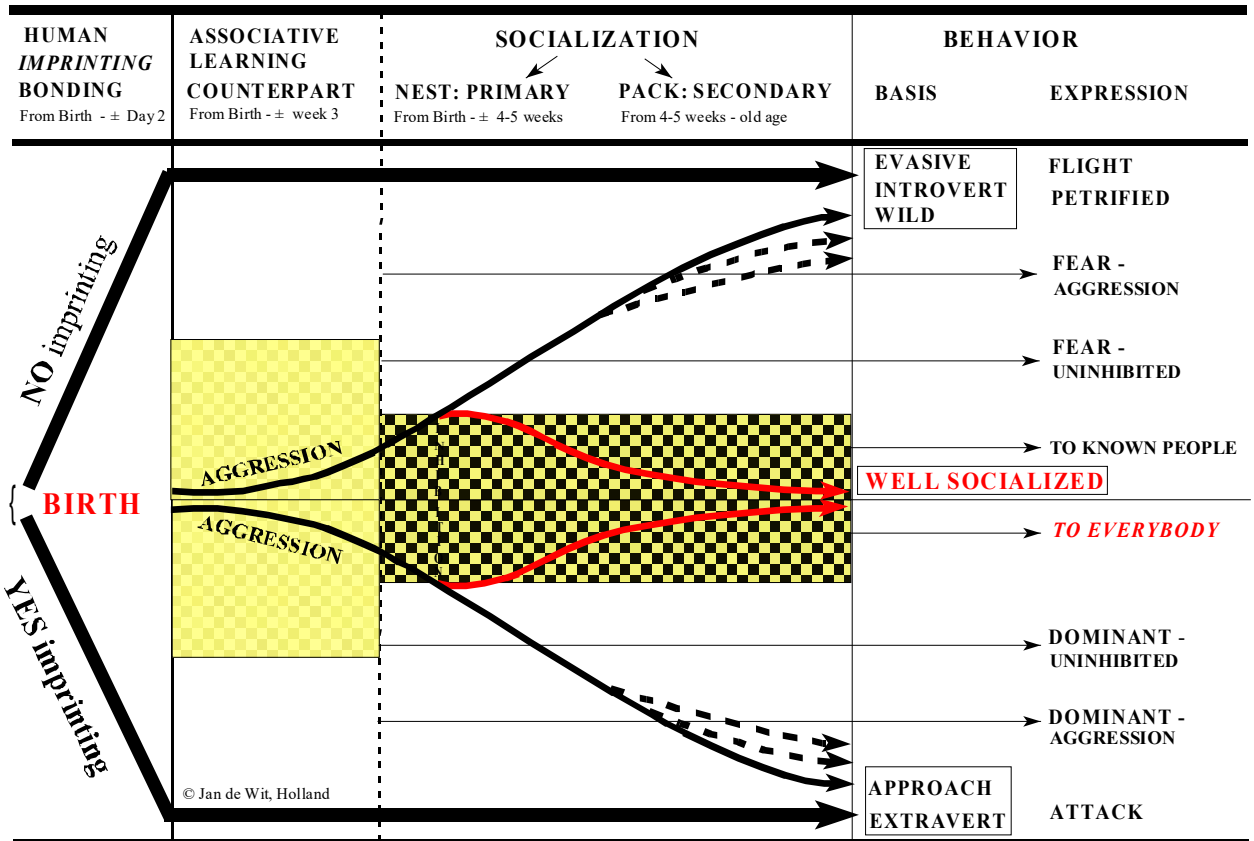
Article #2: Consequences of the research of olfactorial imprinting / bonding for the development of social (dog) behavior

SUMMARY:

DEVELOPMENT OF SOCIAL (DOG) BEHAVIOR

This summarised article is focused on dogbehavior, but underlying scheme can be looked upon as a general scheme for development of social behavior

Scheme # 1: Development of Social Behavior



Coloured section: positive (= leading to desired behavior) influence of humans

Behavior finds its origin in three aspects:

- genetics: predisposition's in species, parents (choice), individual differences
- physical: deviations, malnutrition, hormonal changes/problems, other internal stimuli etc.
- environment: external stimuli, intra- and interspecific and non-specific.

It may be clear that **as a consequence of this development scheme** only de latter is highlighted.

In the subschemes the several processes: Imprinting, Associative Learning Period and Socialization as well as the followed Behavioral consequences are elaborated.

SCHEME 2: THE PERIODS

In consequence of my Research of 1983 the behavioral development scheme based upon Scott and Fuller (1965) in my opinion had to be adapted.

They postulated that the rate of development is a discontinuous one. There are periods of time during which there are only changes perceptible for the astute observer, followed by dramatic behavioral changes, which occur over a relatively short period of time.

There can be little doubt about these results.

Nevertheless the following periods can be indicated at the associated time of appearance:

1. My Research made scientifically clear that **Imprinting** occurs olfactorially **AT BIRTH** and - based upon a research by Bern University, literatured by Althaus 1984 - within a period of approximately 2 days.

2. According to E.H.Hess (Imprinting, 1973) imprinting is -in a social context- always followed by a period he called the **Associative Learning Period**, in which by the means of warming, feeding and protecting the imprinting is consolidated (and thus also called the **Consolidating Learning Period**).

Scheme # 2: The Periods

| HUMAN IMPRINTING BONDING From Birth - ± Day 2 | ASSOCIATIVE LEARNING COUNTERPART From Birth - ± week 3 | SOCIALIZATION | | BEHAVIOR | |
|--|---|---|---|----------|------------|
| | | NEST: PRIMARY From Birth - ± 4-5 weeks | PACK: SECONDARY From 4-5 weeks - old age | BASIS | EXPRESSION |
| { BIRTH | | | | | |
| | © Jan de Wit, Holland | | | | |

3. **Socialization** is said by Scott and Fuller to take place at 3 to 12-14 weeks of age. They described this phase as the period in which social rules are learned from the species with which it cohabits.

Any European misunderstanding or confusion about the conception of Imprinting and Socialization could originate from the American way of filling in the concept "Socialization". According to Fox (1971) " 'socialization' is preceded by a process in which the attachment to an object -usually the mother-animal - is allowed".

This first period is, since the dramatic experiments of Lorenz, in Europe separately defined as the concept 'Imprinting'.

According to Fox and Stelzner (1967) "socialization is highly stimulated by such a early attachment", but a distinction between both fundamentally differing processes keeps the discussion at a plain level.

There can be little doubt that the research by Scott, Fuller and Fox and others revealed a great deal about a puppy's development.

On the other hand, an investigator that measured the variability of behavior in the puppy during 15 minutes a day when it was being weighed or fed, may well overlook the subtle behavior that occurs in what they called the neonatal period.

Nevertheless their scheme of the development of behavior is based upon these observations,

Numerous times it is said that, because of the not highly developed brain, motor and sensory capacities and complex adult forms of behavior cannot yet be learned.

These postulations were based upon an examination of the nervous system by Harman in 1958. He found that the brains of newborn puppies are mostly unmyelinated, with the exception of the trigeminal nerve. Unjustly he attributed the role of the trigeminus to the taste sense, we now know the trigeminus is known for its facial motory and the sensibility of , among others, the nostril mucous. A role in the scent capacity is more obvious.

Later examinations also revealed that unmyelinated nerves are well capable of conducting impulses though in a less quick rate.

The main objection against the results of the early investigators is that it is evident that a neonatal pup is far different from the adult animal that is capable of types of complex learning and thus it is not the appropriate subject to study complex behavior.

Any astute breeder or observer may notice that, although it seems that the pup's sole motivation at this early point of its life seems to be the maintenance of an optimum internal environment, it does seek warmth and food and avoids pain and cold.

This subtle behavior can be watched from the very first day and therefore in my scheme socialization takes place **from this very first moment.**

SCHEME 3: IMPRINTING / BONDING

In our social society we are merely interested in the imprinting of dogs to humans as the stimulating basis for adjusting dog behavior to the human society. As the main result of imprinting on humans a dog considers itself as a member of our society (the 'pack') and thus it may well act within the same restrictions as in its natural situation: accepting a social dominance hierarchy with now man as the 'alpha-leader'. Thus giving the possibility of habituation and deprivation of maladjustment.

Imprinting can be defined as a 'a switch on of a genetically pre-programmed trigger'.

It has a binary purpose:

Purpose 1: to recognise a subject as a foster and to bond with that. In nature: a parent of the own species.

Purpose 2: to aim the future social behavior towards the bonding subject. In nature: the own species.

Every species has its own specific sense on which the imprinting switch is triggered.

These 'trigger-senses' determinates an animal's behavior and therefore they are sometimes called the determination senses.

Some birds are triggered by sound / auditorial stimuli (gulls) other by movement / visual stimuli (goslings).

Some mammals (primates and humans ?) by feeling / tactile stimuli.

Some other mammals (deer, goats, rabbits, cats, **dogs**) are triggered by scent / olfactorial stimuli.

Maybe because of opportunism of scientists, -it is less complicated to do research on animals that have full and recognisable behavior at birth- , little is documented on the latter sense: scent.

Perhaps also because it is more dramatic to the naive observer, most research has performed at so called precocial animals, animals that are neurologically mature when they are born. Fewer researchers have elucidated the imprinting of non-precocial animals, that have a neonatal period of development, during which its sensory and motor capacities develop before it can interact with the environment.

Nevertheless scientific research on scent ability at birth has been published by Verberne (cats, 1982), de Boer (cats, 1977), Schalken (rabbits, 1978) and Schley (imprinting of rabbits, 1981).

Fox (1971) performed an experiment in which he attempted to determinate whether the neonatal dog could respond to olfactory stimulation and make simple associations between the olfactory stimulus and the nest environment.

He found that pups exposed to an olfactory stimulus applied to the mammary region of the mother during the first five days of life did show an orientation toward that stimulus outside the nest that was distinctly different from the reaction of the control animals which had not been previously exposed to that olfactory stimulus. These results led Fox to conclude that "the neonate dog can respond differentially to odours and that habituation to an odour can develop at this early age".

The process of imprinting is about the same in every species: it is a short, irreversible process, that is limited to a so-called critical period (best demonstrated by Lorenz and Harlow), with a tremendous impact on the individual and its later social life.

The irreversibility is doubted in later work, but the results of later performed tests which showed other results, may as well be explained as 'taming of wild animals'.

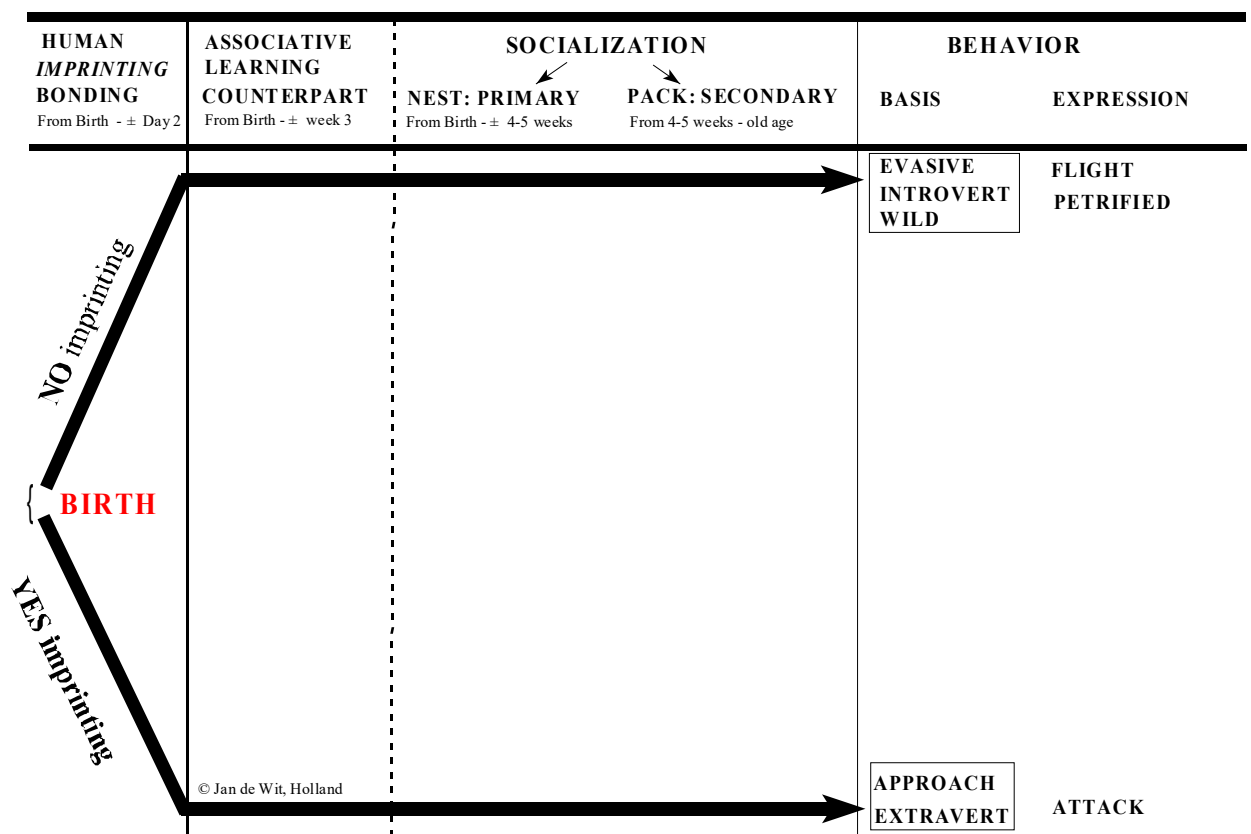
Imprinting is often described as a necessary basis for socialization but the characteristic elements of each (as earlier stated with the American ‘socialization’) were fewer distinguished.

Unlike socialization, imprinting is not a learning process, but more likely a unique chemical/neurological change in the amygdala of the limbic system: the trigger with the specific stimulus (‘switch on’).

Any scientific research reveals that imprinting occurs **right after birth**, whether the social mammal is born deaf and blind or not. The wolf / dog would be the only known exception, what is very unlikely.

There is no alternative: imprinting does or does not occur, and because of the absence of learning stimulation: there is no variety in the intensity.

Scheme # 3: Imprinting / Bonding



It may be clear that a wolf / dog in natural situations is always imprinted on its own species: it can smell the liquid, its mother, its littermates and itself.

Experiments were performed with a SPF (Specific Pathogen Free) group of Beagle puppies at the laboratory of CPB/TNO where I held my Research. It revealed that pups, taken out by a caesarean and individually reared by a foster-cat, showed a (deviating) imprinting on the cat. The later social behavior was focused on the cat.

Later, when a whole litter was kept together, this impact was of less importance.

Stated behavior in Scheme # 3 is a consequence of this impact if **no further positive (human) influence** occurs. Positive influence is: leading to desired behavior, mostly understood as inhibiting, socializing behavior.

The dog with no imprinting on humans will act as a wild animal and will always try to flight.

The animal which is imprinted on humans and without further (positive) influence by humans will -as a rule- not be afraid of humans and thus may act not frightened but might attack, if necessary (see next scheme).

Imprinting is known to occur in a short, irreversible period.
For instance sheep have about 20 minutes to imprint on their mother.
No research has been done on scent-imprinting by dogs.

However, an investigation performed by the University of Bern in 1984 (literature by Althaus) proves that pups are able to sort out the individual scent of the mother-animal, by a significant discriminating between the bitches and an artificial leg with a different smell. This research revealed that the optimum time was at 0-2 days of age. This discrimination ability is of high importance for the imprinting process.

Based on this information the next scheme may explicit the limited process:

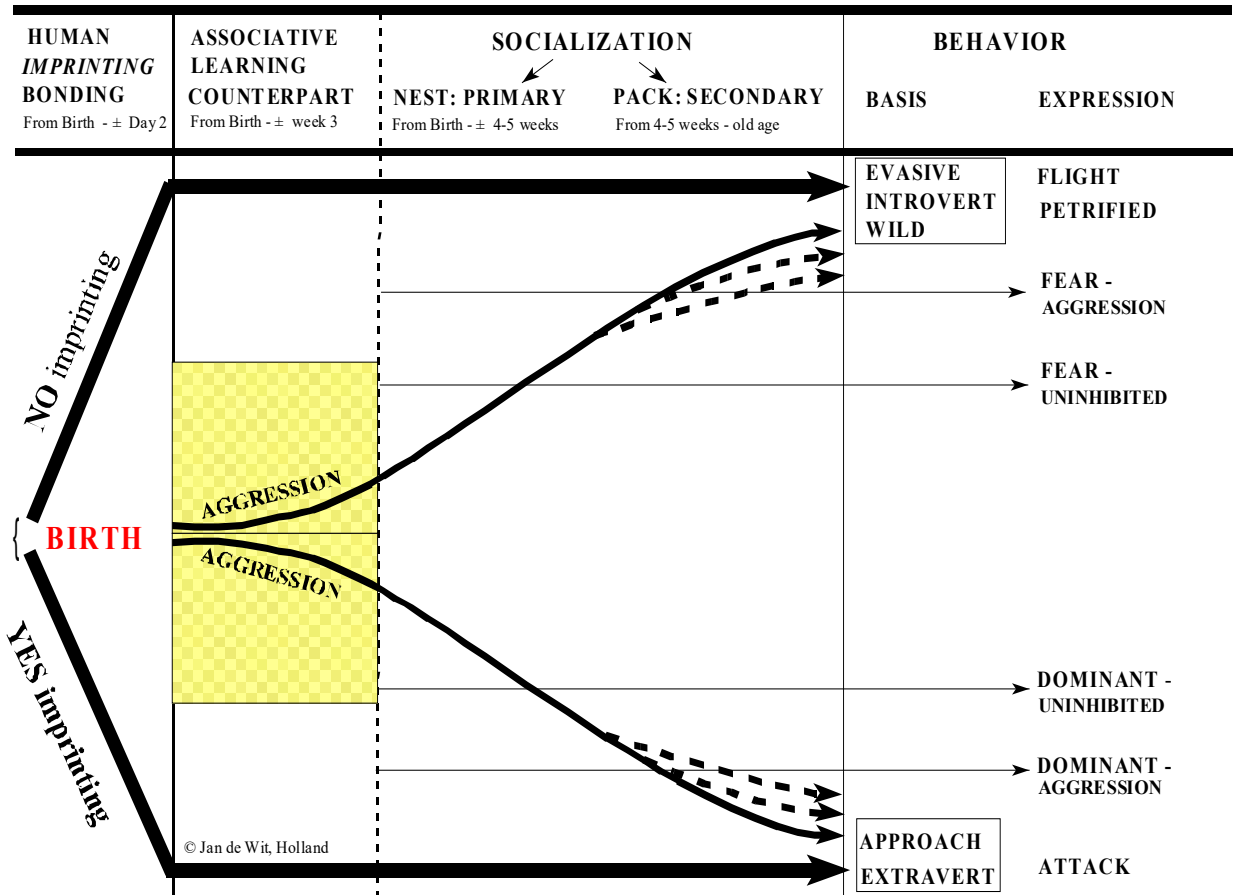
Scheme # 4: Imprinting Optimum Time (estimated)



SCHEME 5: THE ASSOCIATIVE LEARNING PERIOD (Consolidating Learning Period)

Consolidating Learning Period for the imprinting process and the development of predestinated individual specific aggression lines

Scheme #5: The Associative Learning Period



Coloured section: positive (= leading to desired behavior) influence of humans

Whether a new born is deaf and blind (non-precocial) or fully equipped (precocial), after birth it undergoes a period more or less caretaking by its parent(s). Depending on the species this has a wide range of variety: warming, feeding, protecting, etc.

By the means of this nursing the imprinting is consolidated by positive associations.

At the same time 'aggression' -not in the meaning of violence, but as an antipole of flight- is developed. Every species, every breed and every individual has its own genetic predestinated expressions and limitations.

As a human we can stimulate a puppy's imprinting on humans by gently rubbing the puppy, associating the nursing by its mother with our scent, picking it up and avoiding negative associations with human scent.

The resulted behavior from these influences are -in the scheme- to combine with the non-imprinting or positive-imprinting possibilities **on humans**.

Accordingly, a 'non-imprinted puppy' will react on the basis of evasive behavior, thus giving a fearful expression.

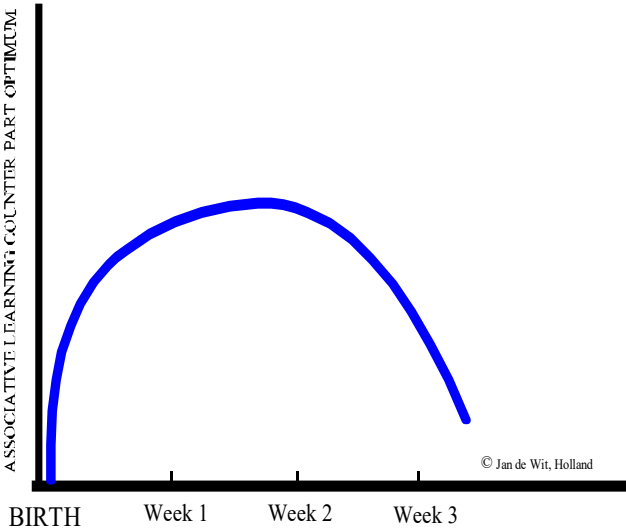
If non or little positive human influence occurs in the Associative Learning Period a puppy will develop a behavior that is known as 'fear-aggressive behavior' . Although there seems to be a contradiction in this term, it gives meaning to the behavior that a dog will compensate its fear by aggression in the meaning of violence.

When there is a lack of imprinting, but positive influences have occurred during the Associative Learning Period, but not further, the dog will not learn any inhibition to bite or play. Being on the fear-line, it will always compensate this lack of inhibition and trust, by little limitation to 'low-biting' his opponent.

A puppy that is imprinted on humans will show no fear towards humans and thus - if by lacking further positive influences- will show inhibited behavior, but now in a dominant version: no bite restrictions, but biting higher parts and more dominant.

This period declines with decreasing nursing, at about 3 weeks, being not accidentally also the dramatic raise in the socialization period.

Scheme # 6: Associative Learning Period Optimum Time (estimated)



SCHEME 7: THE SOCIALIZATION PERIOD

If one is in the opportunity to observe a litter from birth, one can see the very subtle examples of socialization happen from the very first moment after birth, for example the slow motion 'struggle' for the best teat. Some puppies like to lay more on top than underneath, which may give an indication for later behavior.

This subtle behavior was not recognized as social behavior, because most ethologists took adult behavior as a standard for developing behavior, in stead of referring to the stage in which puppies are at that moment. Puppies in a certain stage are restricted by morphological, physiological and psychological limitations that are characteristic for that stage.

Scott and Fuller looked at puppy behavior too antropomorphically.

In stead of taking the dog's determination sense (scent) as a starting point for investigation, they took the visual sense (human) as an issue for the start of 'real behavior' measured by brainactivity by means of an electro-encephalon-scan (page 93), that was merely measuring eye-activity. As we know, eyes are not open and therefore do not show related brainactivity before approximately 12-16 days. It would have been more appropriate to investigate the scent ability and refer the behavior to that result.

In consequence of my Research and observations of litters, another development scheme is more obvious: **FROM BIRTH** puppies (and wolfcubs in the wild) learn how to behave and play with each other in the warmth of the nest and nearest surroundings.

There is a miraculous rise of action from about 3 weeks of age, when the myelination of the nerve system is so far developed that eyes and ears are opened and more motor ability is possible.

In this first period (also called the Primary Socialization Period) all learning takes place from the littermates and the dam (and sire if present); for instance: bite inhibition, physical limits / boundaries are learned.

Popular stated: the **playrules** are established.

When the surroundings are extended to a larger area than the nest, the other members of the pack or human social group become of interest.

The Secondary Socialization Period occurs: **social rules** are learned by interaction: how to react on a social dominant member, on noises or strange objects, all kinds of play as a practise or base for later.

The basis for genetically predestinated dominant or submissive behavior is extended.

If there are no limitations to behavior, a puppy can develop it in any possible way. With our modern breeding there is a wide range of genetically predisposed basis of aggression in the individual breed as well as in the individual dog.

Any education or training is: offering limitations, especially if the genetically predestinated frame is based upon a hierarchical dominance system as with the wolf and dog.

Therefore in nature deviated behavior is rarely seen, the social inhibition is a strict one.

Off-limit behavior is placed between the boundaries of tolerance of the packleader and the other packmembers.

In many cases dogpuppies have to rely on the conscientiousness of their breeder, whether they will grow up maladjusted or not. The breeder has the responsibility for the choice of parents and will thus lay the genetic base of the behavior.

In the 8 weeks after birth, the breeder has the full responsibility to provide all the necessary stimuli for extending the genetic base of behavior that will turn a puppy into a fully socially accepted dog.

Deprivation may occur if the environment of development is not full with the needed stimuli. A breeder may therefore be held responsible for behavioral deprivation and/or deviation due to a lack of these stimuli.

The problem is that humans mostly define dog deviations upon **not fulfilled expectations**. A socialization test for puppies from 5-7 weeks (Socialization Test by de Wit) may reveal most of the present agonistic behavior including deprivations. Not as a blueprint for later behavior, but as a 'manual' for new owners what special, individual treatment a puppy would likely to have.

The positive stimuli in the socializationperiod are leading to inhibition of undesirable behavior.

Is this restricting the influence of the Imprintingperiod ?

In no way !

Puppies that did not undergo a positive imprinting towards humans, may possibly in the socializationperiod **learn** how to deal with humans. They might be afraid at first, leading the owners to the well-known statement: "Let the puppy come towards you, then it is ok, do not go towards him. He might be frightened !"

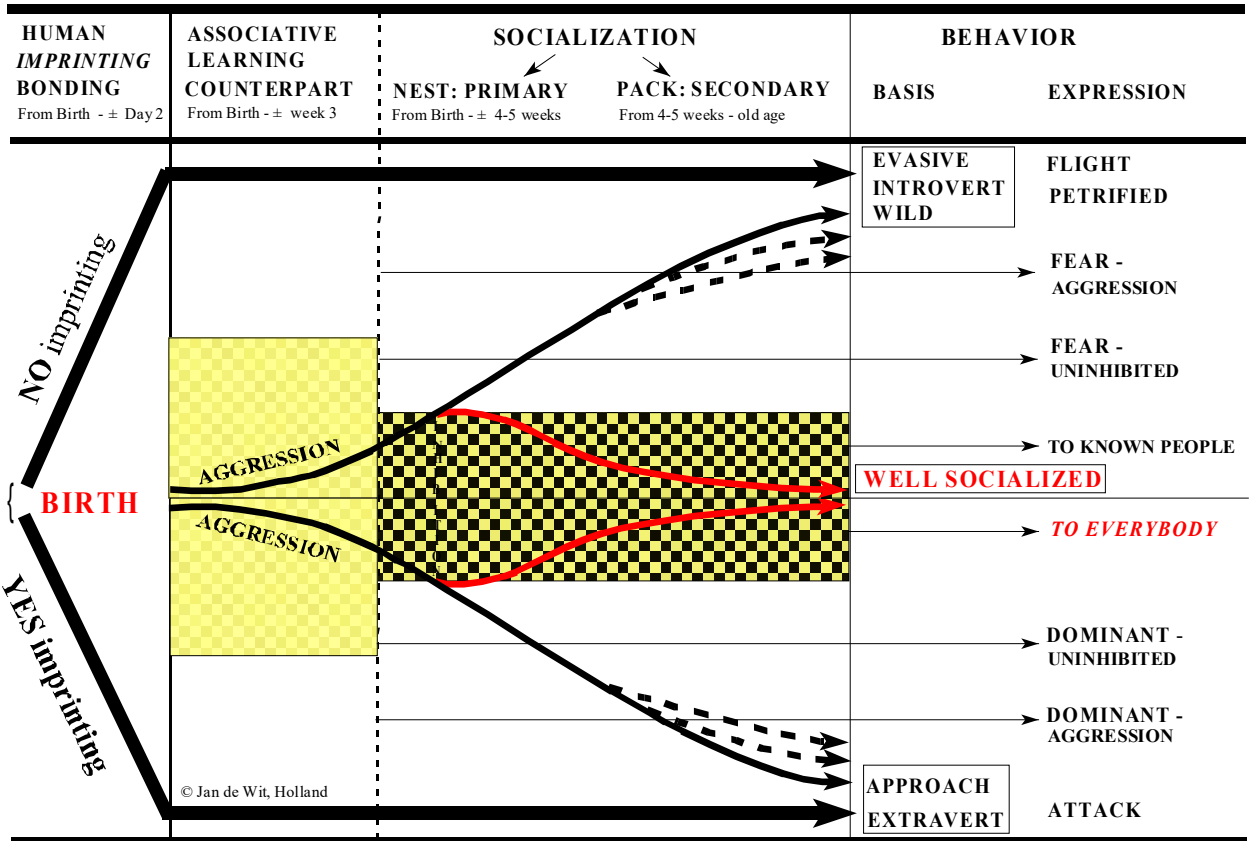
A puppy that had a good imprinting on humans has a positive base of trust in humans (it feels itself as one of the species) and has learned the good influences by socialization .

Therefore this puppy is well socialized towards **everybody** that treats him in the same right way.

This basis has proven to be the best for any kind of work that will be executed later: agility, policework, guidedog or 'just' a pet.

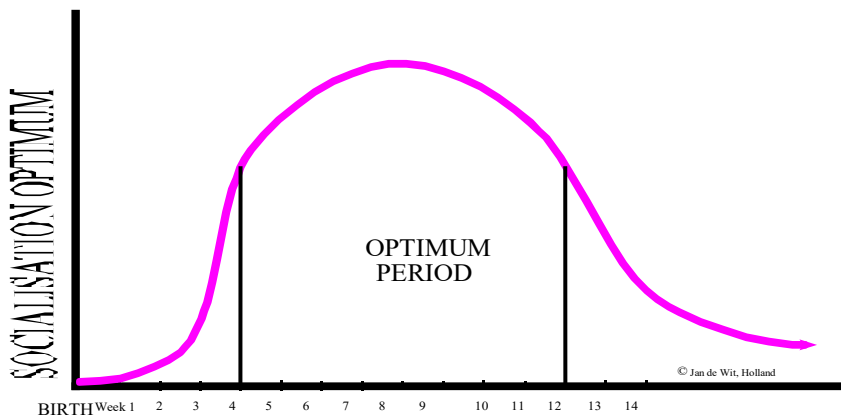
The human purpose of domestication is a life together -a symbiosis- with dog, a basic trust by imprinting and socialization is a lifetime guarantee.

Scheme # 7: The Socialization Period



Coloured section: positive (= leading to desired behavior) influence of humans

Scheme # 8: Socialization Optimum Time (estimated)



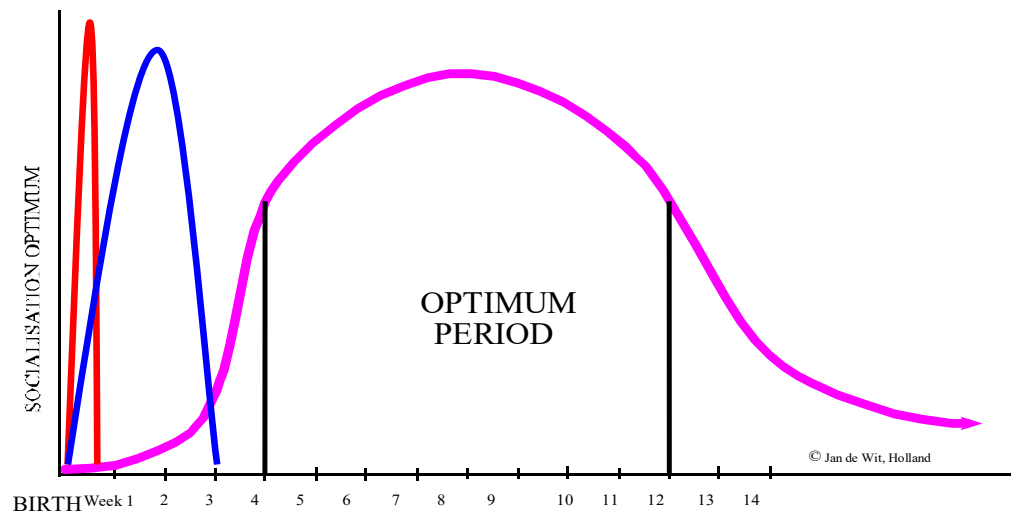
Scheme 8 shows there is an optimum period in which socialization occurs in a very high rate with the maximum of influence.

After being about 12 weeks of age a puppy is still able to socialize, but new influence has to counteract against obtained experiences.

The socialization (=learning) has to reduce these trustful influences first before new behavior is allowed.

SCHEME 9: DEVELOPMENT AS A DISCONTINUOUS PROCESS

Scheme # 9: Optimum Times for Development of Behavior



As Scott and Fuller stated: behavioral development is a discontinuous process. They state that socialization occurs from about 3 weeks until 12 weeks.

From the research by de Wit (1983) it is revealed that the several periods **simultaneously cover each other:**

| | |
|------------------------------------|------------------------------------|
| Imprinting : | day 1, 2 and perhaps 3 |
| Associated Learning Period: | week 1, 2 and 3 |
| Socialization: | week 1 until 12 and further |

CONSEQUENCES FOR BREEDERS:

It may be obvious and already said in so many words: breeders are responsible for the basis of behavior (temperament) of their puppies. Their influence is of such **great impact**, that a complete book is appropriate.

After the genetic basis is chosen, a conscientious breeder has the full responsibility to provide all the necessary stimuli during from birth.

Just a few on-liners:

At birth this is: make sure human (scent) is all around and that a newborn puppy can obtain this.

Cuddle the puppies as much as possible (and is healthwise justified) and put them back after this at their mother's to get warmth, licks and milk.

As soon as the pups are mobile: be in the box or pen and play with them *at their height*: crawl on the floor and put nose to nose contact.

Play with them, 'chew' their ears and inhibit too strong bites.
Roll them over on their backs, pick them up, be gentle.

Give sound-, sight- and scentstimuli, but do this in a *gradual* way: always think that in the wild wolfcubs gradually enlarge their territory from the hole, to the playground just before the hole and further.

Do not throw your puppies into the deep !

Watch how a good mother / bitch is doing and try to imitate.

OTHER ARTICLES BY Mr. Jan de Wit:

In English:

- Canine ethology - the development of neonatal dog behaviour:
Published by the APBC: <http://www.apbc.org.uk/commun.htm>
- Puppy Socialization Test

In Dutch:

- Thesis: Kynethology - 1983 (in Dutch)
- Book: Bobtail and Bearded Collie – 1985 (with schemes on colour inheritance)
- Toepoels Dog's Encyclopaedia: headeditor behavioral subjects:
1988 and 1995
- several articles in leading dogmagazines in the Netherlands and Germany