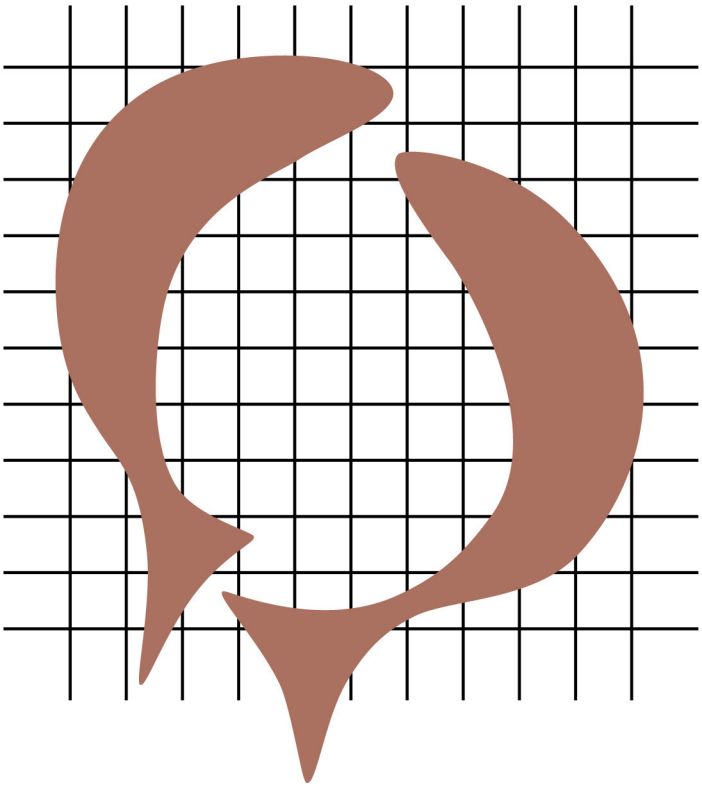
NVG NEWSLETTER

20th year no. 2, December 2011

Nederlandse Vereniging voor

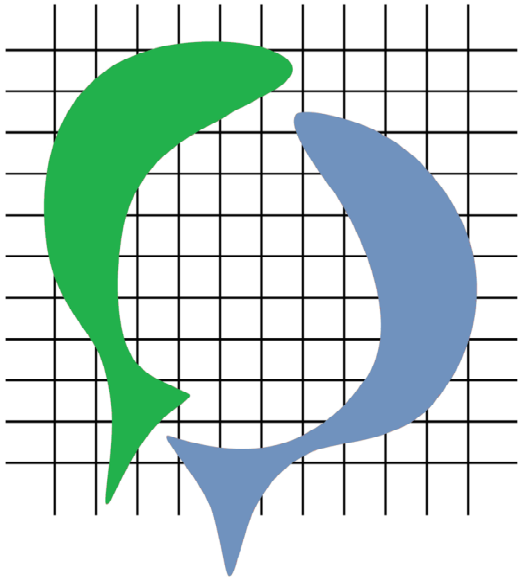
Gedragsbiologie



Contents:

NETHERLANDS SOCIETY FOR BEHAVIOURAL BIOLOGY

The Netherlands Society for Behavioural Biology aims at strengthening behavioural biology in the Netherlands and the direct surroundings. We strive for top quality in all of the behavioural sciences with respect to teaching, research, and public debate. The society organizes a yearly meeting and distributes this biannual newsletter.



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Dr. Hans Slabbekoorn (Newsletter)

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Editorial Preface

This newsletter has 18 well-filled pages, which gave me work but also made me happy. There seems to be a growing enthusiasm to put something into our newsletter. Few minutes after I send a call for contributions, my e-mail box starts to ring. And if I ask one of two people to send in a piece about their thesis defense, they both send all the required material within a day! I take this as evidence for a growing affinity with our society and I am already looking forward to the special Anniversary issue next year. Any nice ideas?

The editor: Hans Slabbekoorn

SOESTERBERG

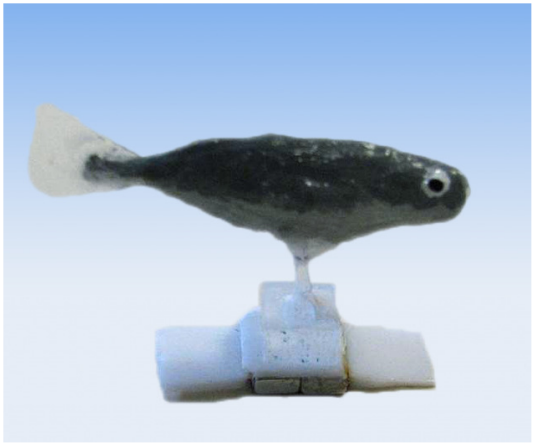
~ Report from the last NVG-meeting at the Kontact der Kontinenten by a special reporter.

About pink sisters, robo-fish and counting raisins

By: Elske de Haas (WUR)

The NVG-meeting was held for the second time at the Kontakt der Kontinenten (KdK). The conference centre originally served as a missionary's home for the SVD (Societas Verbi Divini - Gezelschap van het Goddelijk Woord). In 1961, most of the religious activities moved elsewhere and the last missionaries left in 1989. The oral presentations took place at the "Cenakel"; a chapel in which the colours and paintings gave the NVG-meeting a special holy feeling this year. The chapel used to be part of a monastery for nuns (Dienaressen van de Heilige Geest van de Altijddurende Aanbidding). The nuns served as advisers for the youth, who could consult the pink sisters (referring to their white and pink vestments) seated behind bars (to prevent any physical contact). The night-guard of the KdK told us that this confinement could have led to some dwelling spirits of pink sisters during the nights. We, however, did not see any.

On Wednesday, we started the NVG-meeting in the evening with **the Baerendse lecture** by Jens Krausse from the Humboldt University in Berlin, who spoke about social networks and collective behaviour in humans and fish. Despite obvious differences, it appears that both species, when in a group, follow individuals which act as leaders and seem to know where to go. Interesting experiments with large groups of German volunteers showed that just a few leaders in a group can lead the group into a certain direction, without using any sort of communication. Fish will also follow a robot fish when it appears to make a correct choice (they do not follow when 'robo-fish' clearly moves away from food). This mechanism also helped us at the KdK whenever dinner or lunch was dislocated from predetermined areas.



On Thursday, we started with a session on Applied Behaviour with Bas Rodenburg who replaced Liesbeth Bolhuis as a chair (home with a back injury). This session by PhD-students from Wageningen

University consisted of studies on group behaviour in pigs, laying hens and horses. The next session addressed juvenile learning in song-birds and within-clutch variation in several avian species. Sanne Moorman (UU) showed that the level of Zenk-expression in the NCM of a songbird (comparable to Wernicke's area of a human) was upgraded in juveniles when listening to a tutor song. This part of the brain is also activated in 2-3 month old babies when they are exposed to speech. Pralle Kriengwatane (University of Western Ontario) exposed songbirds to unpredictable food supply during early life and showed that the stress treatment resulted in a reduction of the number of learned songs, a reduced spatial learning, low behavioural flexibility, high immune functioning and higher fat deposition. Martina Miller (RUG) taught us about the asynchrony adjustment of avian mothers compensating marginal chicks (later-layed eggs of smaller sizes) with more testosterone. She explained that this may be beneficial in good years, but detrimental in poor years.

The last speaker of the morning was Marc Naguib, the new professor in Behaviour Ecology at Wageningen University. Marc spoke about asymmetrical signals and what they mean to eavesdroppers. In nightingales, unmated males sing more often during the night, while mated males sing more during the day. The timing of listening of females should therefore be adapted to this phenomenon in order to find an unmated male. If the same holds true for men and their nocturnal singing behaviour remains unknown….

After lunch there was time to examine posters with plenty of opportunity for extensive dialogues with presenters and bystanders. Poster abstracts from Joris Koene (VU, Amsterdam), Marije Oostindjer (WIAS), Paul Koene with two posters (WUR), Seyedmehdi Amininasab (RUG), Ioannis Leris (UU) and Erica van Rooij (Macquirie University, Sydney) can be found at www.nvg.nl. **Erica van Rooij won the poster prize** for her work on the role of bill colour in mate choice in monomorphic finches of Australia.

In the afternoon we continued with acoustic signals, but this time affected by anthropogenic noise. Wouter Halfwerk (Leiden University) exposed nestboxes meant for either great tits or blue tits to a quiet control sound or to a significantly elevated noise level. When great tits had a choice they selected the control box over the noise box, while the blue tits (left with little choice) most often ended up in the noise box. Errol Neo (also Leiden) told us that it is not silent under water – due to sounds that fish make but also due to sounds from industrial machinery. The zebra fish in his study increased swimming speed in response to

noise but did habituate rapidly and, when given the chance, they did not try to escape the noise exposure. Hans Slabbekoorn (Leiden again) informed us about changes in chiffchaff song frequencies and syllable use due to city or highway noise in various natural areas around Leiden.

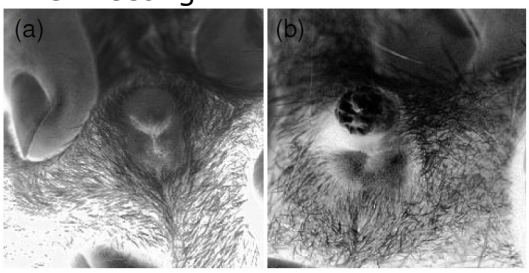
After dinner we continued with Julia Fischer of the German Primate Centre and Gottingen University. Her exciting work includes exposing African baboons to sounds and other cues. Apparently baboons do not understand finger pointing, but do follow gazing behaviour. They also find it difficult to distinguish between a small or large number of raisins, although exposing them to different signals prior to gaining the raisins helps them to get the point. Vocal signals from a female baboon during copulation in response to a successful or unsuccessful mating got the audience intrigued by the female perspective. Baboon males were also more attentive when hearing female calls that were recorded during successful matings. Lively discussions continued during the drinks in the bar, with wild speculations about extrapolating the primate information to humans…

On Friday, Jean-Christophe Billeter (who replaced Monique de Jager) spoke about the colours of fruit flies and how they affect behaviour, pheromone manipulations, and social interactions. Subsequently, interesting work was presented by PhD's from the RUG, studying the effects of early environment on life span (Migael Briga), and telomere length as indicator for somatic redundancy (Jelle Boonekamp). Gulia Gracceva finished the first session with explaining the effects of early environment and the phenotype of rat mothers on the development of stress and personality. Take-home message: do not blame everything on mum.

After coffee, we had another applied session, with Valerie van den Bos (UVA), who presented her BSc-project on stereotypic behaviour in zoo animals, and Paul Koene (WUR), who also addressed extensively why stereotypic behaviour is an indication of poor welfare. Irene Camerlink (WUR) gave a talk about the positive effect of social nosing on performance of commercial pigs. When pigs receive nose contact they grow better, which is in line with social support theory. Courtney Daigle (from Michigan State, USA) showed us how technology can help to

automatically record chicken behaviour and to obtain information on individuals in large commercial housing conditions.

After lunch, we continued with the topics of communication and partner choice (there was more to learn). Paulien de Bruijn (UVA) showed when larvae excrete pheromones, which may be a signalling pathway by which information is conveye; context dependent and until now relatively unknown. Jorg Massen (UU) informed us about macaques maintaining long-term stable bonds instead of just opportunistic social interactions. In damselflies, Arne Iserbyt (Antwerp University) reported that rare female morphs are more often single and have more time for other things than costly matings. Eventually, Alzbeta Talarovicova (RUG) told us about female genital masculinisation and the differences between two Cavia species (see pictures below from Kraus et al.). Also this last talk let to thought-provoking discussions at the end of what was generally evaluated as another successful NVG-meeting.



PhD Course advisory

By: Paulien de Bruijn (UVA)

It is a very good tradition that since 2008 the Annual Meeting of the NVG is preceded by a PhD workshop. PhD-students that visit this workshop learn from a topical invited lecture (this year, Nick Colegrave who discussed "Using effect sizes in behavioural research") as well as each other. The workshop enables students to discuss problems everybody encounters. This year, we also discussed courses that students can or must follow. This is a tip summary:

- Be selective in choosing courses, but not too selective. You are busy with your PhD-work, but it is also good to broaden your horizon. Stepping outside of your topic makes you more creative.
- Know in advance what you want to learn in a course, be prepared when you go.
- Be honest to yourself on which topics you need training, and actively search for a course on these topics.
- Ask other PhD-students which courses they liked and disliked. They could suggest courses that you have not considered yet. It would be helpful if there was an online evaluation of courses. That way, you can skip courses with bad reviews.
- Courses on statistics: Ask which computer program is used during the course, and if you can work with your own data (if you have any). Avoid courses that will explain statistics only by examples of computer programs you don't use.
- If you do not find a course that deals with your specific questions, do not be afraid to contact specialists, even when they are famous.

Following courses is a privilege, not a burden. When choosing the right

courses, not only will you learn more about your topic or a broader scientific field, you will be more enthusiastic about science as well.

PhD skills survey

By: Kate Lessells (NIOO)

The list of tips on PhD courses came out of a more general discussion, and as part of that discussion we also carried out a survey on how PhD students acquire skills. The survey was rather hurriedly designed, and the biggest lesson is probably that trial-and-error is not a good way to do this! However, here are a few of the results, which may be useful for PhD students and supervisors in stimulating thought and discussion about the ways in which PhD students might acquire various skills.

Discussion among the PhD students generated a list of 16 'skills' and 10 'sources' for acquiring those skills. The survey consisted of a 16 x 10 matrix, and the students were asked to fill in a rating for that skill-source combination if they had experienced it, and otherwise leave the cell blank. The ratings were from -2 to +2 in terms of usefulness. This means that it is possible to calculate the number of students that have experience of acquiring particular skills, or using particular sources, and mean usefulness scores, for the 11 students who completed the survey. Means are unweighted for samples sizes in different sub-classes.

The number of sources used to acquire skills varied between skills (figure 1a). Unsurprisingly, students used the most sources on average (about 6 of the possible 10) for acquiring statistical skills, while

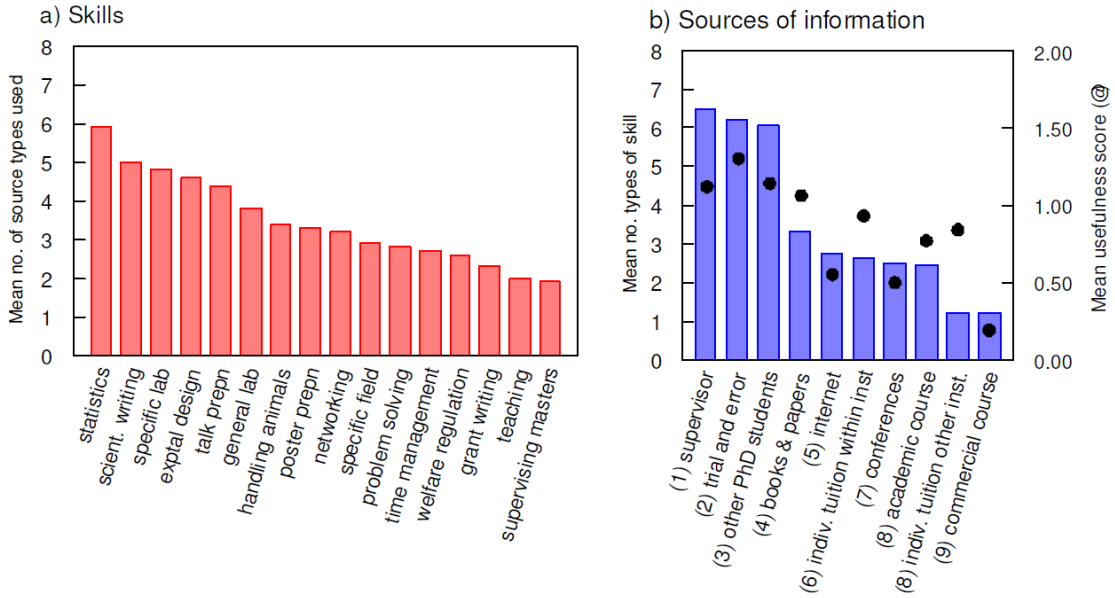


Figure 1. The (a) skills, and (b) sources of information about which the PhD students were surveyed (N=11). Skill types are ranked by the mean no. of source types used, and sources of information by the no. of types of skill. Bars show the means across the 11 PhD students who completed the survey. Points show the means across skill types of the means across students of usefulness scores.

the fewest sources (about 2) were used for acquiring teaching and supervising masters students skills.

Conversely, the number of skills for which a source was used to acquire a skill varied between sources (the blue bars in figure 1b). The 'big three' sources were supervisors and other PhD students, and – unexpectedly – 'trial and error'. However, the term 'trial and error' could also reflect the acquisition of skill through practice. Figure 1b also shows how the students rated the usefulness of different sources (the black spots), with the big three being rated the most useful, and the internet, conferences and particularly commercial courses faring less well.

Of course, the usefulness of a particular source is likely to vary between skills. Figure 2 shows the relationship between usefulness and use of sources for the six skills with the highest mean number of sources used per student. The big three sources have been given distinctive colour symbols - blue squares for supervisors, green triangles for other PhD students, and magenta crosses for trial and error – while the remaining skills are shown as black circles. The big three sources nicely illustrate how usefulness may vary between sources: other PhD students are a relatively unhelpful source for scientific writing, supervisors for specific lab skills, and trial and error for experimental design (see Figure

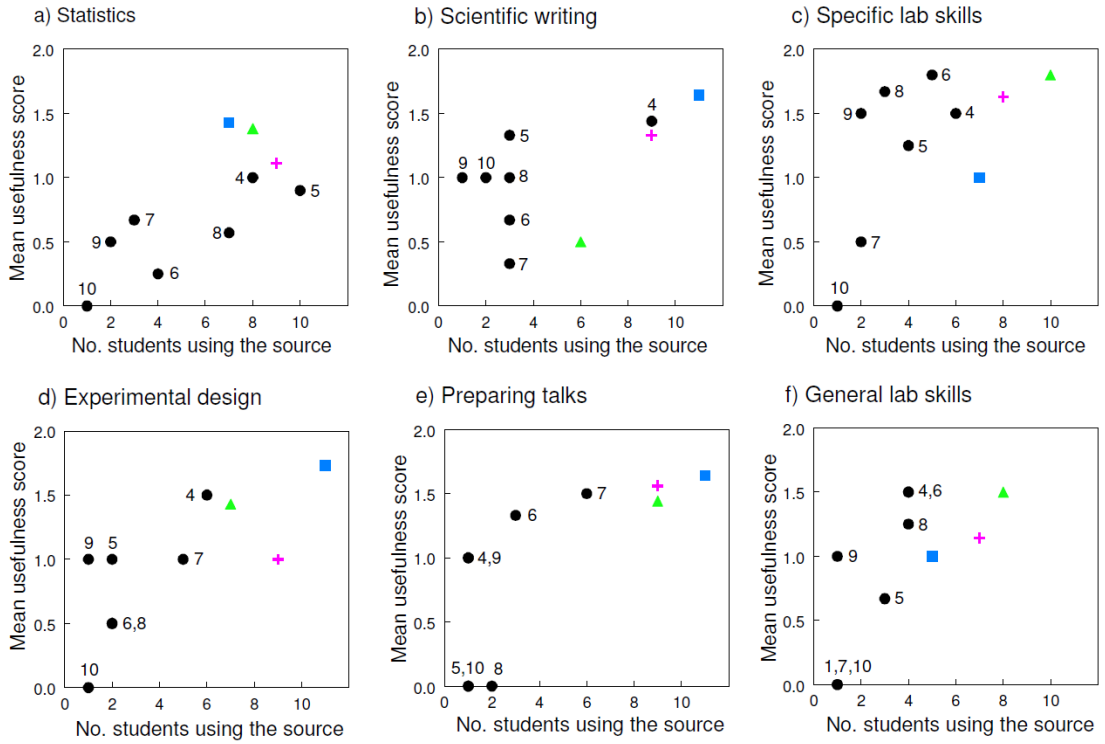


Figure 2. The relationship beween the usefulness score for a source of information ad the number of students using that source for the 6 skills (parts a-f) with the highest mean no. of sources used per student. Numbers next to black circles refer to the skill numbers given in figure 1b. For clarity, the three most commonly used sources of information are given colour symbols. blue squares: supervisors. green triangles: other PhD students. magenta crosses: trial and error.

3). Similarly academic courses were highly rated for specific lab skills, but poorly for statistics. The top-tip to choose statistics courses that use software to which you have access and that allow you to work on your own data (see *PhD Course advisory*) might help to improve the rating of academic courses for statistics.

A second part of the survey asked students to rate how much of a particular skill-source combination they would have liked to experience relative to how much they had experienced it. Students expressed the strongest desire for more help from supervisors, other PhD students, individual tuition within their own institutes and in other institutes and academic courses (see table 1 for skills involved). They would particularly like academic courses on writing grant proposals. They exhibited widespread indifference (or even antipathy) to more commercial courses, trial and error or conferences (at least for acquiring skills) as means of acquiring skills.

Table 1. Skill-source combinations which the PhD students would most like to experience more (combinations which received an average score >1 on a scale of -2 to +2.)

	Supervisor	Other PhD students	Books & papers	Internet	Indiv. tuition within inst.	Academic course	Indiv. tuition other inst.
Statistics	●	●			●	●	●
Scientific writing	●				●	●	
Specific lab skills	●	●	●				
Experimental design	●		●		●		
Talk preparation	●					●	
General lab skills	●						
Handling animals							
Poster preparation							
Networking	●						
Specific field skills	●	●				●	
Problem solving	●	●					
Time management	●						
Welfare regulation	●		●			●	
Grant proposal writing	●			●	●	●	
Teaching	●						
Supervising masters students	●						

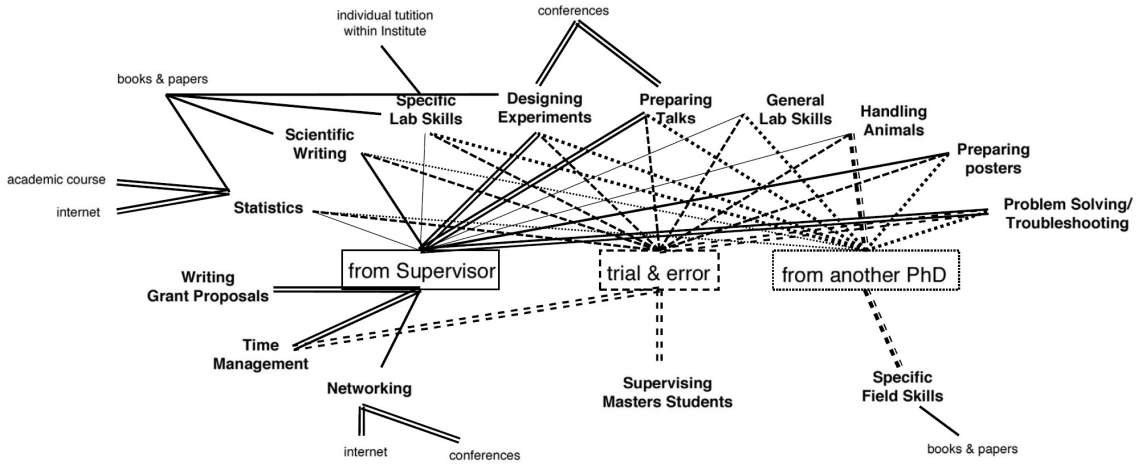


Figure 3. The amount that particular sources are used for acquiring particular skills. Each line is based on the calculation of obs N/exp N, and a value of 1 means that that skill-source was used as often as expected based on the average number of PhD-students using that skill and that source. The thin lines indicate that the obs N/exp N is less than 0.8, the thick lines indicate that the value is between 0.8 and 1.2, and the double lines indicate that the value is more than 1.2. Only values were used in which there were 5 or more respondents (Figure by: Pralle Kriengwatana).

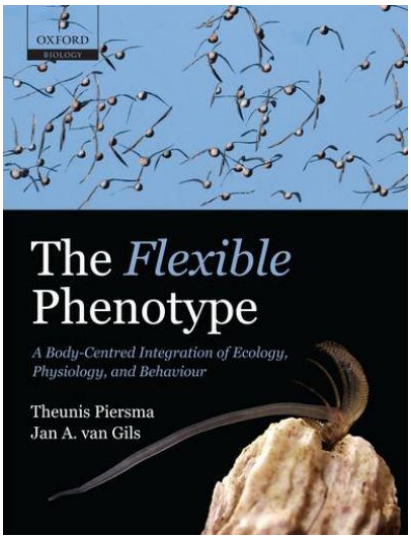
Book Review

The Flexible Phenotype: A Body-Centred Integration of Ecology, Physiology, and Behaviour. Piersma T, van Gils JA (2010)

By: Wouter Halfwerk (LU)

Variation among and within individuals is probably the most important fuel as well as tool of biological research. Our fascination for the diversity of form and function among species has always been an important force driving scientific progress and quantification of phenotypic variation is still the main method among biologists who try to understand the mechanism, development or evolution related to particular traits. Variation arises through genetic mutations, developmental plasticity or phenotypic flexibility. Surprisingly, the latter source of variation has received far less attention compared to the other two, and the main aim of the authors of 'The Flexible Phenotype' is to set this straight.

The central theme of the book '*bodies express ecology*' captures the notion that a large part of an animal's physiology, morphology and behaviour is under strong influence of the environment in which it lives. Animals have to find a balance between energy demands and energy intake continuously, which is heavily determined by ecological conditions, such as temperature, humidity, food availability and predation risk. Fortunately, most animals can rapidly change their phenotypes. Snakes, for instance, rapidly change their digestive physiology and morphology after they have captured a prey. However, the most diverse, cost-efficient, and rapid way to adjust to changing environments is through behavioural flexibility, such as moving to new patches when food becomes scarce, or taking off to cover when a deadly predator suddenly appears on the scene.

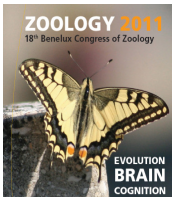


The book starts with some basic knowledge on organismal design aimed at energetic maintenance and other physiological demands and includes some boxes explaining metabolic ceilings and the principle of symmorphis. After some tough, but necessary reading for non-ecologists, the book becomes more and more interesting as it integrates animal physiology with body design and environmental selection pressures. The final parts should be of most interest to behavioural biologists, as it integrates behaviour with physiology and ecology and finally

evolution. In this part of the book it also becomes clear why knowledge of different biological levels is essential to understand phenotypic variation and its reciprocal relationships with the environment and evolutionary change.

The final take home message of the authors may however be a bit frightful to some of the lab-rats among us: that nothing makes sense except in the light of ecology and that work on animal physiology and behaviour can be considered a waste of time if not carried out under relevant environmental conditions.

Wouter Halfwerk is a PhD-student at Behavioural Biology, Leiden University



Sexual conflict and behavioural traits: steps towards a mechanistic integration

The NVG-sponsored symposium was prominently present in the programme of the 18th Benelux Congress of Zoology. After the meeting's opening plenary/Studium Generale on Wednesday evening, the Thursday morning was kicked off by our invited speakers, which were upgraded to plenaries. Both delivered excellent contributions entitled "Two sexes, one genome" (Ted Morrow, Uppsala University, Sweden) and "Sexual conflict over parental investment: behavioural mechanisms determine evolutionarily stable patterns of investment" (Kate Lessells, NIOO-KNAW, Wageningen, Netherlands). The afternoon session was filled with six talks (and a few posters) that covered both vertebrates (birds, mice, monkeys) and invertebrates (insects, molluscs). Our aim to stimulate integration of different disciplines and approaches was clearly reflected in the topics presented. These spanned the spectrum from parental care, ornamentation, mate choice, hormones, promiscuity, sperm competition, to genital morphology and more.

Bram Kuijper (Univ. Cambridge, UK; Univ Groningen, NL) & Joris M. Koene (VU Univ. Amsterdam, NL)

IN THE SPOTLIGHT

~ Special occasions, honorary lectures, prizes, grants and awards for outstanding behavioural biologists.

Marc Naguib started on the 1st of December 2011 as the new chair in Behavioural Ecology at Wageningen University, which is

also part of the Centre for Animal Welfare and Adaptation (CAWA). His work will continue to concentrate on social behaviour and communication among animals in the wild, but attention will also be allocated to animal welfare in livestock farming.

Niels Dingemanse will start on the 1st of April 2012 as an Associate Professor in Behavioural Ecology at the Ludwig Maximalians Universiteit (LMU) in Muenchen. At the same time he will lead a research group at the Max Planck Institute for Ornithology (MPIO) in Seewiesen (as a so-called 'Brückenprofessur'). Niels will continue his work on Behavioural Ecology of individual variation ("personality") in great tits (*Parus major*), and on Evolutionary Genetics of life-history and behaviour in crickets.

International course for PhD-students in Animal Behaviour
Lund University, Sweden
20th-24th February 2012

LUND UNIVERSITY

Course description: The course will contain lectures from the two course leaders (Machteld Verzijden and Ben Chapman), and a number of invited speakers from both Lund university (Michael Tobler; Caroline Isaksson; Mattias Osvath; Charlie Cornwallis) and elsewhere (Simone Immler -Uppsala University; Dan Franks - York university, UK; Niels Dingemanse - Max Planck institute for Ornitology, Seewiesen, Germany; and Hans Slabbekoorn - Leiden University, the Netherlands). Before the course starts, the students will receive a reader with recent papers exemplifying research on the course topics (including e.g. Fundamental concepts in behaviour; Research methods; Experimental design; Behavioural development; Physiology and behaviour; Animal cognition; and Sexual selection).

Students are required to read these before the course starts, and use this background knowledge to enter the discussions after lectures. In addition, students are required to prepare a presentation of their research project, and highlight the animal behaviour aspects. Students will broaden their theoretical insights but also gain analytical skills with hands on experience during three workshops (on Social networks; Animal personality; and Acoustic analyses). The course will be beneficial for both beginners and more experienced behavioural ecologists. Our emphasis will be on student participation and learning, irrespective of their initial level.

More information? Contact Machteld Verzijden at:
machteld.verzijden@biol.lu.se

INSTITUTE of BIOLOGY LEIDEN

Roadside Ecology of Birdsong

Symposium at the occasion of the thesis defense of Wouter Halfwerk at Leiden University on the 1st of March 2012 (9.00-12.00) at the Sylvius building, Leiden.

Speakers: **Ken Otter** - University of Northern British Colombia (UNBC): *Chickadee social relationships*; **Marc Naguib** - Wageningen University (NIOO): *Great tit personalities and networks*; **Ruud Foppen** - Dutch Centre for Field Ornithology (SOVON): *Road impact on birds*; **Bart Kempenaers** - Max Planck Institute for Ornithology (MPI): *Impact of light pollution on birds*; **Wouter Halfwerk** - Leiden University (IBL): *Impact of noise pollution on great tits* (13.45 Thesis defense)

THESIS DEFENSE

~ Recently defended PhD-theses on animal behaviour. Target is to provide some background and to highlight an interesting finding in a single figure.

NIOO

Philipp Sprau from the NIOO defended his thesis on *"Song in space : the effects of song structure and singer location on territorial behavior in nightingales"* at Groningen University on the 28th of October 2011.

http://dissertations.ub.rug.nl/faculties/science/2011/j.p.sprau/

By: Philipp Sprau

The enormous diversity of signalling behaviour in animal communication has evolved through a variety of selective forces deriving from preferences of receivers and manipulative abilities of signallers. The general aim of this thesis was to elucidate how song structure and rival location can affect territorial behaviour of receivers and thus to better

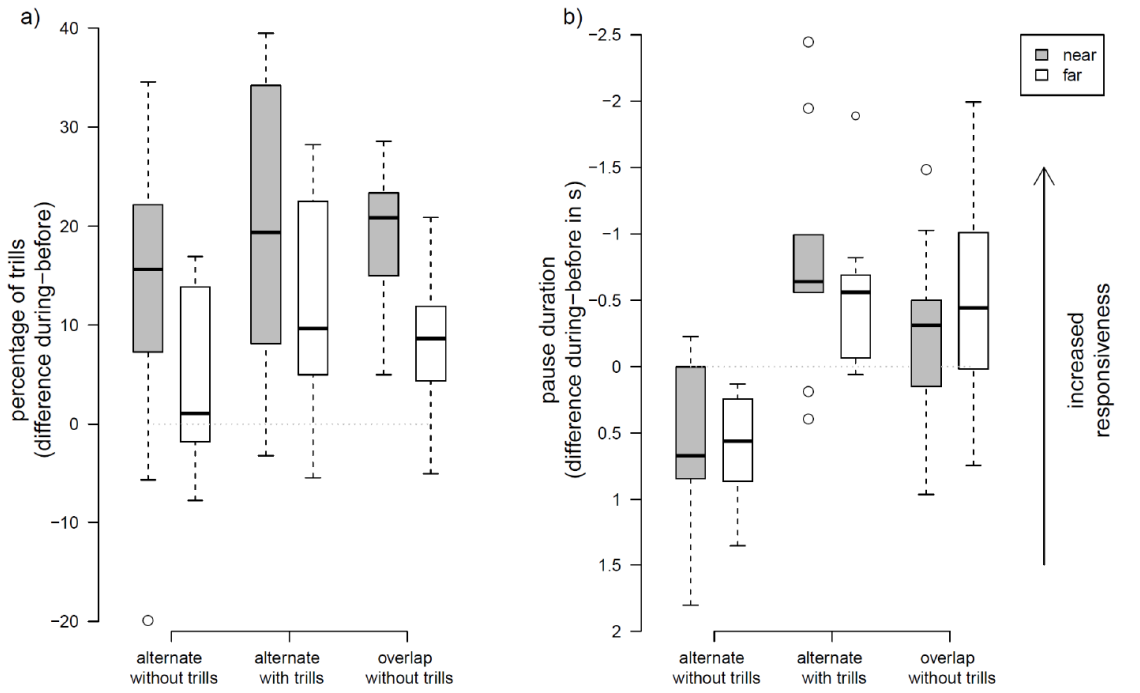
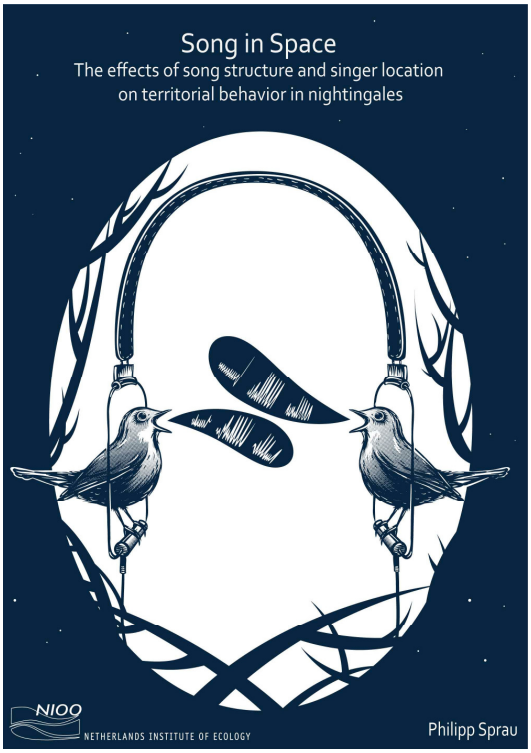


Figure 1. Responses of territorial male nightingales to playback broadcast at two different distances. Playbacks consisted of two functionally similar treatments that differed in their transmission characteristics and a control treatment. We used song overlapping and songs containing rapid broadband trills as treatments simulating an aggressively singing rival and an alternating treatment without trills as a more moderate control playback. In contrast to song overlapping *per se*, trills degrade quickly over distance so that trills broadcast at far distances should not be perceived as threatening compared to song overlapping. We found that (a) challenged individuals responded to close playbacks by increasing the use of rapid broadband trills and (b) that when being broadcast at a far distance, songs containing trills still evoked a strong response by challenged individuals. These findings provide new insights into distance-dependent effects of song across territory boundaries and thus highlight the importance of song as a long range signal in communication networks.

understand how individual, ecological, and social characteristics may have shaped the use and function of vocal and spatial behaviour in communication networks.

Findings from the first part of the thesis that addressed the importance of particular aspects of signal characteristics revealed that the performance of physically challenging song structures can be used as an indicator to reliably predict age of signallers. I further show that the combination of functionally similar signals can enhance the overall signal function.

In the second part, I focused more on ecological and social influences on vocal and spatial signals. Findings revealed that distance between individuals strongly impacts the use and the perception of signalling strategies. Most importantly, I show that distance towards unfamiliar rivals also matters outside territory boundaries and that social relations between neighbors are important for signaling behavior. Moreover, my experiments reveal that the vertical use of space, i.e., signaling height, can also affect territorial behaviour. Lastly, my experiments



show that also persistence during territorial intrusions has long-term consequences for territorial behaviour of residents.

In conclusion, findings from this thesis emphasize the dynamical nature and diversity of vocal and spatial strategies in territorial systems and contribute to a better understanding of general principles of signalling diversity in communication networks.

REFERENCES:

Sprau, P., Roth, T., Schmidt, R., Amrhein, V. & Naguib, M. 2010. Communication across territory boundaries: distance-dependent responses in nightingales BEHAVIORAL ECOLOGY 21**:** 1011-1017.

Sprau, P., Schmidt, R., Roth, T., Amrhein, V. & Naguib, M. 2010. Effects of rapid broadband trills on responses to song overlapping in nightingales. ETHOLOGY 116**:** 300-308.

"Philipp at work"

Universiteit Antwerpen

Hector Rivera Guttierez defended his thesis on *"Song consistency and plasticity in a sexual selection context: a study of multiple acoustic signals in the great tit (Parus major)"* at Antwerp University on the 28th of October 2011.

By: Hector Rivera Guttierez

I investigated whether multiple acoustic characteristics provide reliable information in the context of

sexual selection, using the great tit (*Parus major*), as a model species. Particular attention was paid to song consistency and plasticity, two song characteristics that have been little studied in this species, but nevertheless have been found to play an important role in sexual selection and acoustic communication in several bird species. I collected recordings during four consecutive years following a standardized protocol and I also performed different playback experiments to investigate, from the receivers' perspective, whether acoustic signals were able of eliciting specific responses.

First, great tit song has very limited plasticity both in repertoire and acoustic characteristics. Great tits do not seem to add new song to their repertoire during adulthood either within or between years (see Figure). This lack of repertoire plasticity suggests that great tits are age-limited learners. In an additional study I investigated real-time song frequency plasticity in the framework of territorial interactions. This study revealed that great tits do not alter their frequency during territorial encounters to match the song of a rival male, confirming the lack of plasticity.

Second, both cross-sectional and longitudinal data suggested that individuals living longer exhibit a larger song repertoire. Repertoire size is learned during the first year of life. Stress (nutritional/environmental) suffered during early development may affect brain development and hamper song memorization with a carry-over effect. It is possible then, that repertoire size is providing information about genetic quality or stress suffered at early age.

Third, I observed that the expression of song consistency is age-dependent (see Figure). Song consistency increases during the first three years of life, when a peak is reached, to decrease after four years of age. A playback experiment indicated that the differential expression of consistency is salient to receivers, eliciting differential aggressive responses and suggesting that singing in a consistent fashion may signal dominance or aggressiveness. On the other hand, decreased consistency at old age may suggest that there is physical and/or physiological deterioration caused by aging. This is to the best of my knowledge, the first study quantifying senescence in birdsong in free-living birds.

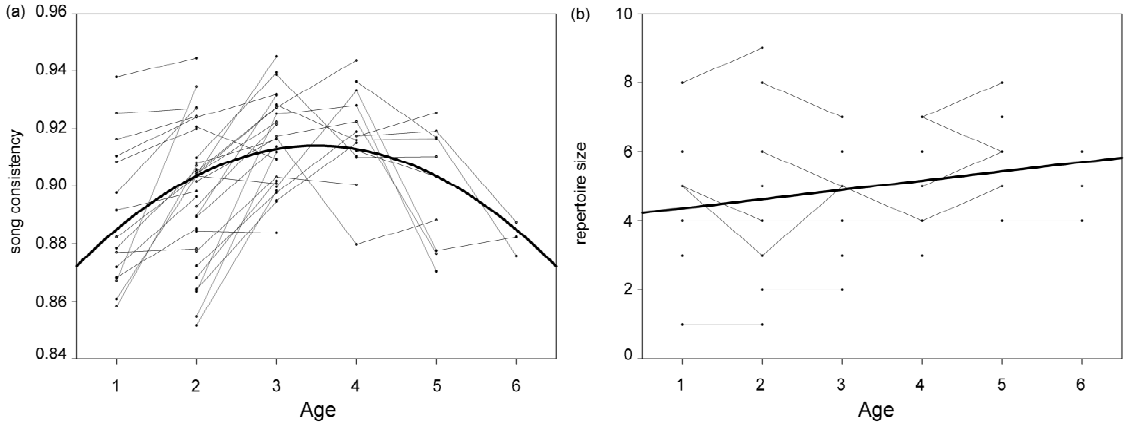


Figure 1. Within-individual variation of (a) song consistency, and (b) repertoire size, as a function of age. Thinner lines represent within-individual variation between years. Thicker lines show the general model that best describes the variation (a) quadratic model R^2=0.19, (b) linear model R^2=0.05. The sample size is the same (N=45) for both song parameters (song consistency and repertoire size), but because many males have a similar repertoire size there seem to be fewer individuals.

The main conclusion of my study is that great tit song is simultaneously conveying multiple messages about different aspects of condition at different time scales. While females may use repertoire size as a signal of stress at early age or genetic quality, song consistency is signalling current age and may provide information on aggressiveness or dominance during male-to-male singing interactions. Moreover, some acoustic characteristics did not correlate with any measurement of quality, suggesting that some song traits may provide unreliable information.

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Rivera-Gutierrez, H. F., Pinxten R., & Eens, M. 2011. Songs differing in consistency elicit differential aggressive response in territorial birds. BIOLOGY LETTERS 7**:** 339-342.

"Hector at work"

Conferences & Meetings

- **ASAB–2011**, ASAB Easter meeting of the Association for the study of Animal Behaviour, 11-13 April, Aberystwyth, UK http://asab.nottingham.ac.uk/meetings/

- **ABS–2012,** Annual meeting of the Animal Behavior Society, 4-7 June, Albuquerque, New Mexico, USA: http://animalbehaviorsociety.org/

- **BGI–2012,** 42nd Annual meeting of the Behavior Genetics Society, 22-25 June, Edinburgh, GB, http://www.bga.org/

- **ISBE–2012**, 14th International Behavioral Ecology Congress, 12-17 August, Lund, Sweden, http://www.isbe2012lund.org/

- **ISAE–2012**, 46th Congress of the International Society for Applied Ethology, 31 July - 4 August, Vienna, Austria: http://isae2012.com/

- **ESEB–2012**, 14th Congress of the European Society for Evolutionary Biology and First Joint Congress on Evolutionary Biology, 6-10 July, Ottawa, Ontario, Canada: http://www.confersense.ca/Evolution2012/index.htm

- **EBBS–2012,** Meeting of the European Brain and Behaviour Society: "Stress, the story of our social lives", 13 July Barcelona, Spain: http://www.ebbs-science.org/cms/upcoming/ebbs-satellite-at-fens-barcelona-2012.html

- **ECBB–2012**, 6th European Conference on Behavioural Biology, 20-22 July, Essen, Germany: http://www.ecbb2012.org/

- **Measuring Behavior–2012,** 8th Conference on Methods & Techniques, 28-31 August, Utrecht, the Netherlands: http://www.measuringbehavior.org/mb2012/home

- **BCZ–2012**, 19th BeneluxCongress of Zoology, Brussels, Belgium: http://www.beneluxcongress.com/

- **NVG–2012**, Annual Meeting of the Netherlands Society for Behavioural Biology **(20th Anniversary)**, 28-30 November, Kontakt der Kontinenten, Soesterberg: www.gedragsbiologie.nl

- **Behaviour 2013,** Joint meeting of the International Ethological Conference (IEC) and the Association for the Study of Animal Behaviour (ASAB), 4-8 August, Newcastle, UK http://iec2013.com/

- **AquaticNoise-2013**, 3rd International Conference on the Effects of Noise on Aquatic Life. http://www.an2013.or