



SOCIAL GENETIC EFFECTS FOR GROWTH IN DANISH LANDRACE PIGS INCREASE WITH GROUP SIZE

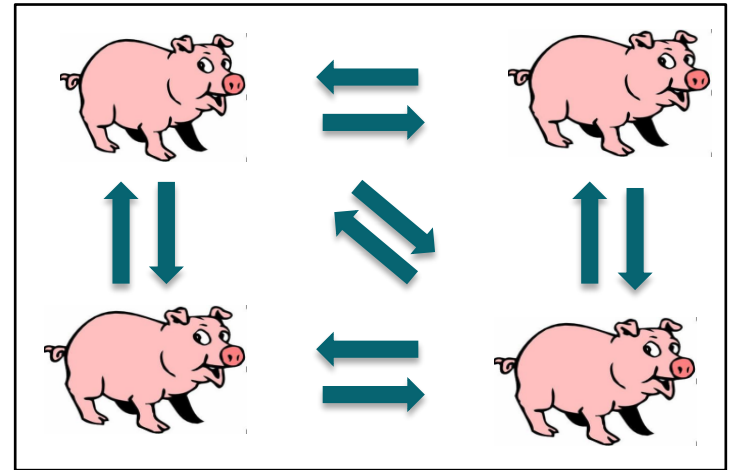
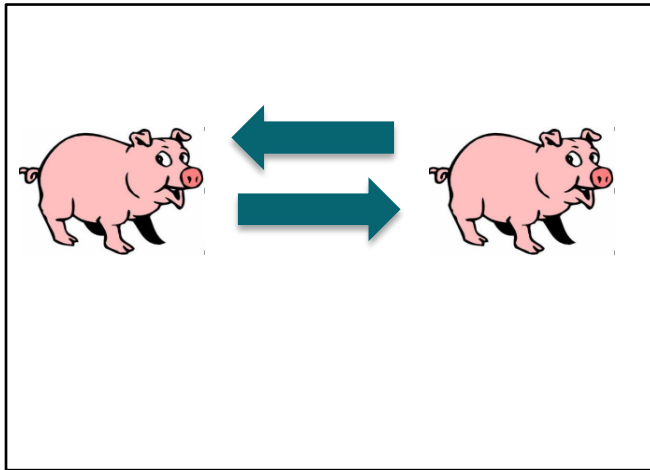
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INTRODUCTION

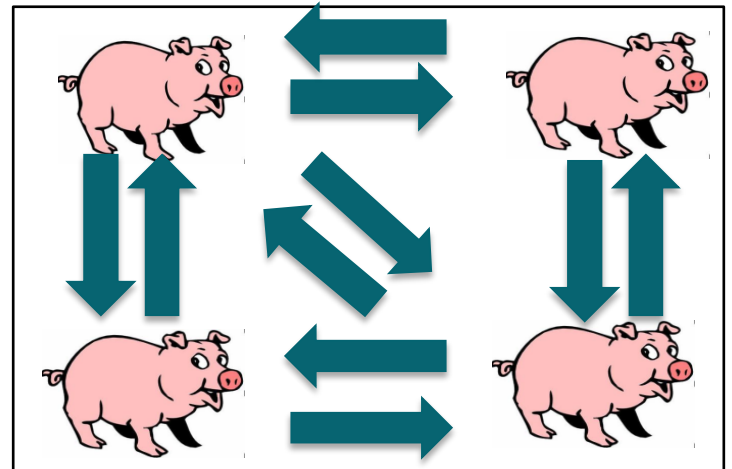
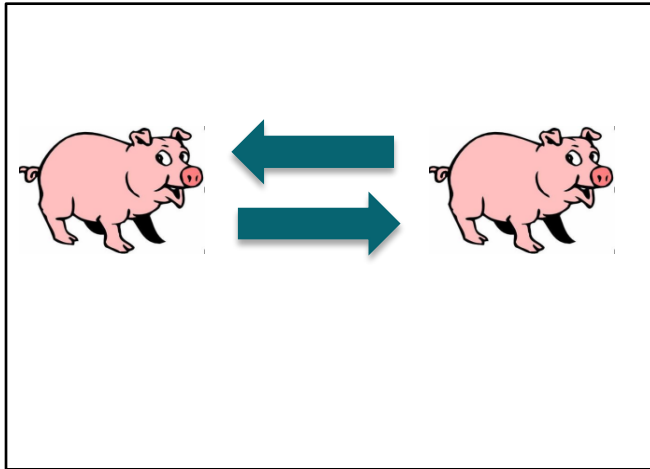
Theory of social effects and group size:

- a) Each pig has the same total social effect on other pigs in group
- b) In larger groups, social effect "diluted" over more pigs



INTRODUCTION

No dilution of social effects with increasing group size:



- Pigs are housed in pens with varying group size
- Do social genetic effects depends on group size?

TESTED HYPOTHESIS

Social genetic effects for LTDG in pigs depend
on group size

DATA AND TRAIT

- Landrace
- Home performance test for growth in breeding herds (30 - 100 kg)
- Weights of all pigs in the pen at end of test

Daily gain from birth to slaughter (Life time daily gain):

Weight at end of test

number of days from birth to end of the test

DATA

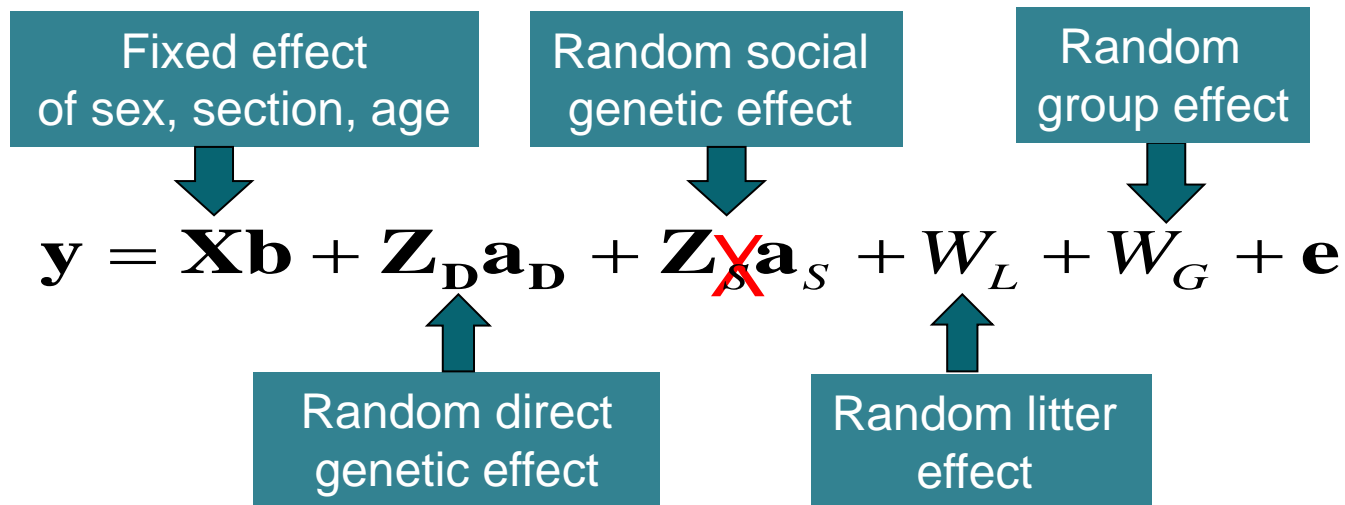
- ï Known group composition of pigs during performance test but not in weaner unit
- ï Number of pigs in pen at start of test: 8 to 15
- ï Approx. same space allowance per pig
- ï Males and females in separate pens
- ï 14 breeding herds
- ï Some confounding between herds and group size

NO OF OBSERVATIONS AND GROUPS

Group size (n)	No of animals	No of groups
8 – 9	14,898	1,815
10 – 11	20,242	1,900
12 – 13	16,227	1,336
14 – 15	18,622	1,295
(all) 11.49	69,989	6,346

STATISTICAL MODEL FOR LTDG

Social genetic model:



section = part of stable in a herd, test in same period (within ~ month)
All pens in a section have same no. of pigs

age = age at end of test

ESTIMATED PARAMETERS

Genetic (co) variances:

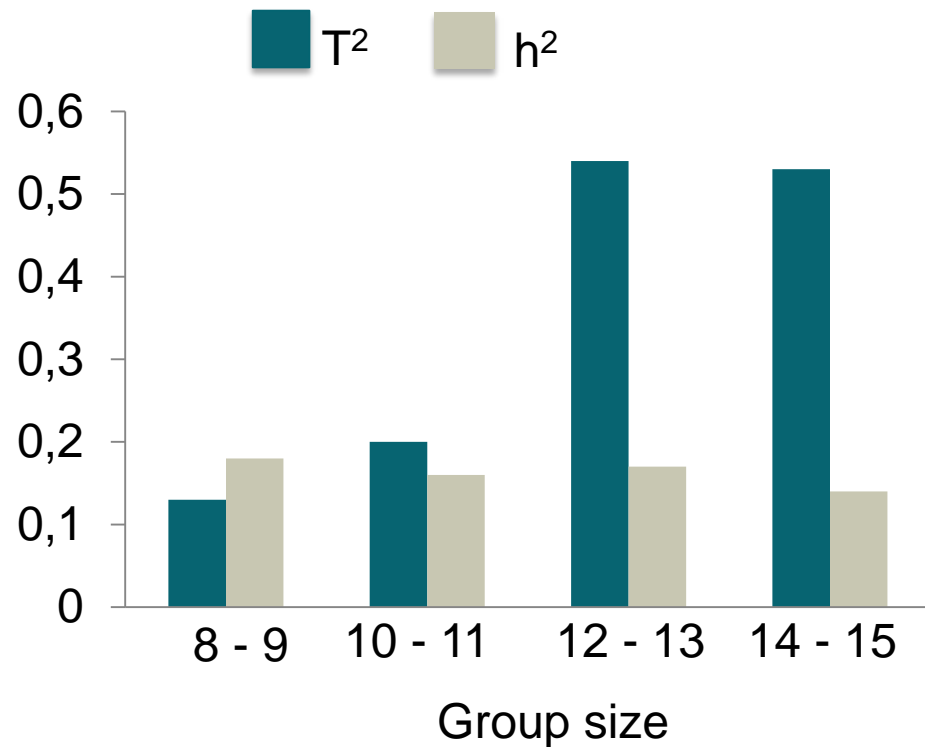
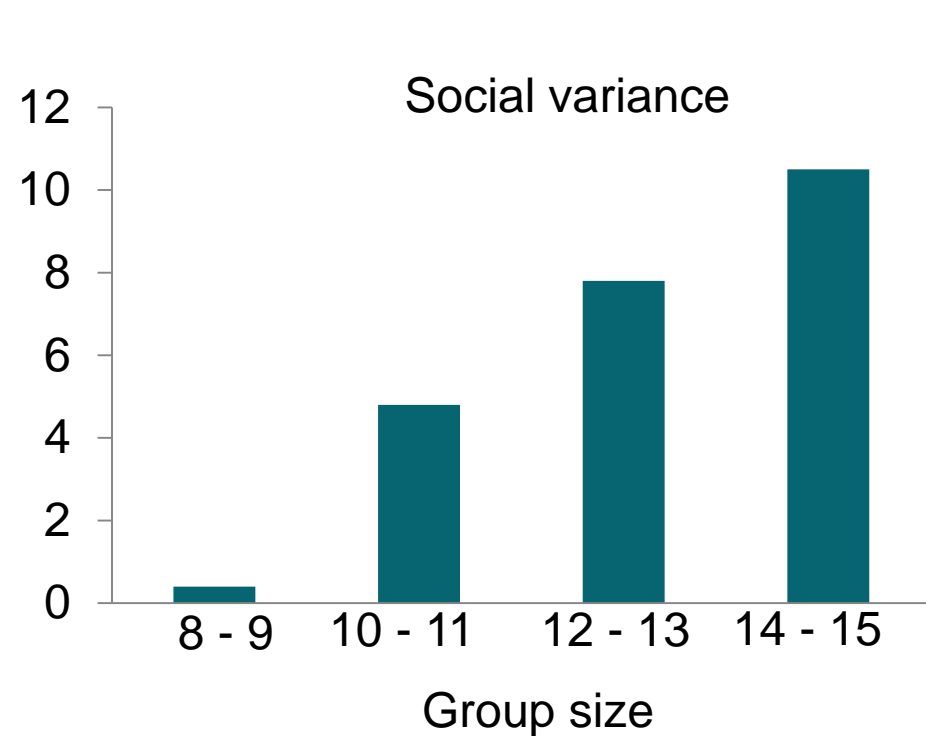
$$\tilde{A}_{A_D}^2 = \text{direct}, \tilde{A}_{A_S}^2 = \text{social}, \tilde{A}_{A_{DS}} = \text{direct*social}$$

Total heritable variance: $\tilde{A}_{A_T}^2 = \tilde{A}_{A_D}^2 + 2(n - 1) \tilde{A}_{A_{DS}} + (n - 1)^2 \tilde{A}_{A_S}^2$

n = group size

Total heritability (T²): $\frac{\sigma_{A_T}^2}{\sigma_P^2}$

RESULTS – LTDG AND GROUP SIZES



REVERSED DILUTION – FULL DATA SET

Increase in social genetic effects with increasing group size =
Contrary to theory

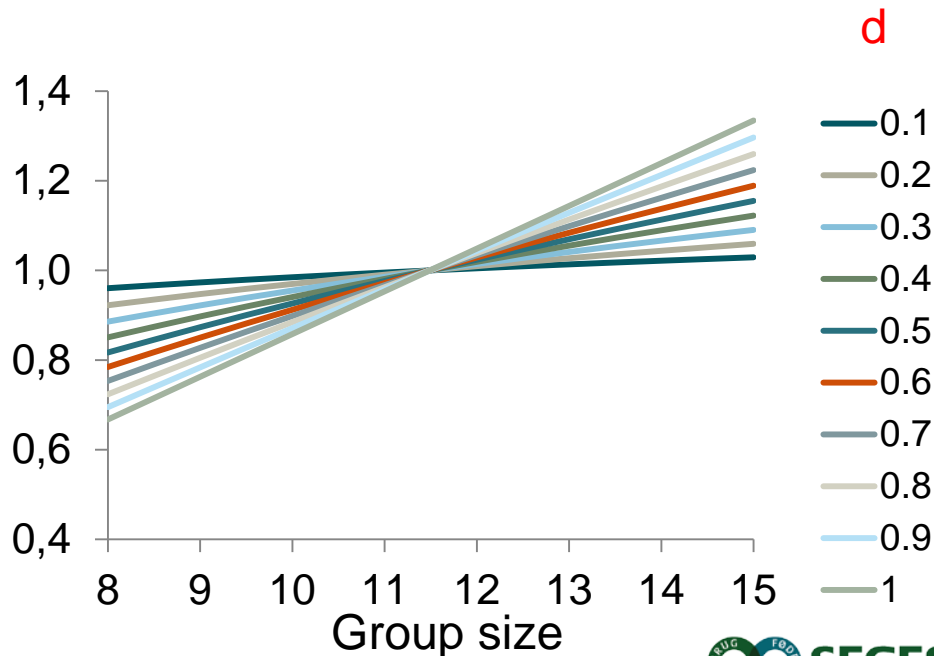
Reversed dilution:

$$\left(\frac{\hat{n}-1}{n-1}\right)^{-d}$$

n = group size

\hat{n} = average group size

d = degree of dilution (0,...,1)



CONCLUSION

Indications that social genetic effects for LTDG in pigs increase with increasing group size

but.. confounding between herd effects and group size