

Background and Purpose

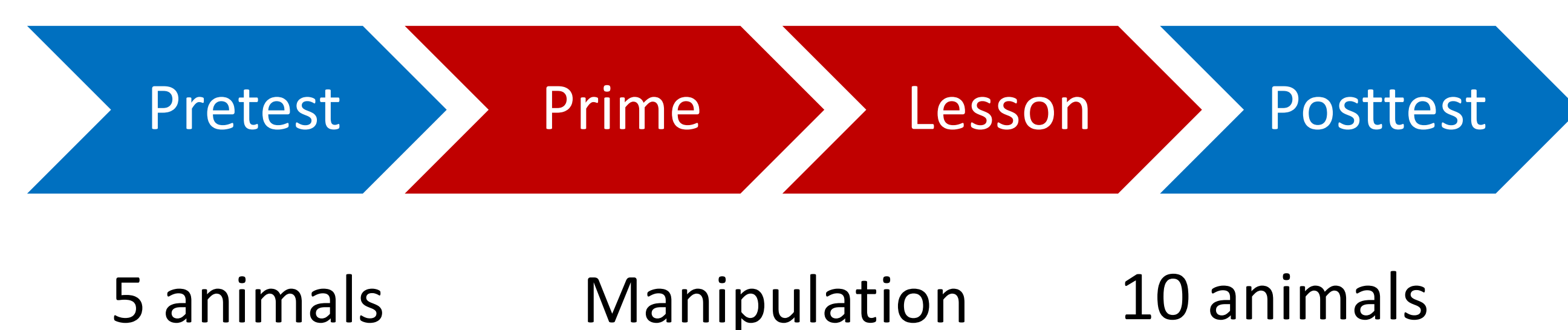
- Several studies have shown that young children do not endorse dramatic life cycle changes such as metamorphosis (Rosengren, Gelman, Kalish, & McCormick, 1991)
- Might be related to essentialist thinking (Herrmann, French, DeHart, & Rosengren, 2013)
- Underestimating within-category variability is an integral part of essentialism (Gelman, 2004)

Could manipulating perceptions of within-species variability lead to a decrease in essentialism, and in turn better learning from a metamorphosis lesson?

Design

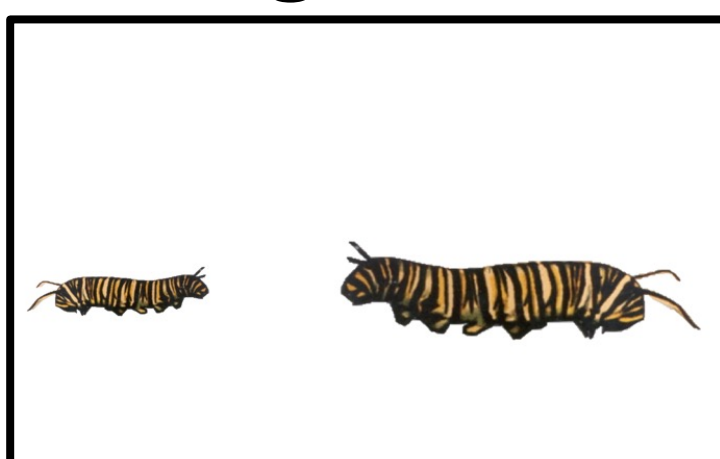
93 children total (50 girls, 68% white)

| | |
|--------------------|-------------------|
| 20 Kindergarteners | 29 Second graders |
| 28 First graders | 16 Third graders |



Types of Change

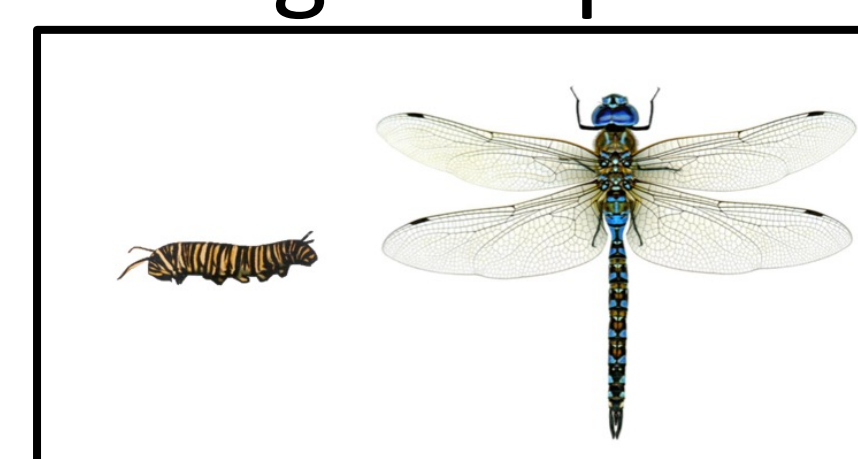
Change in size



Metamorphosis



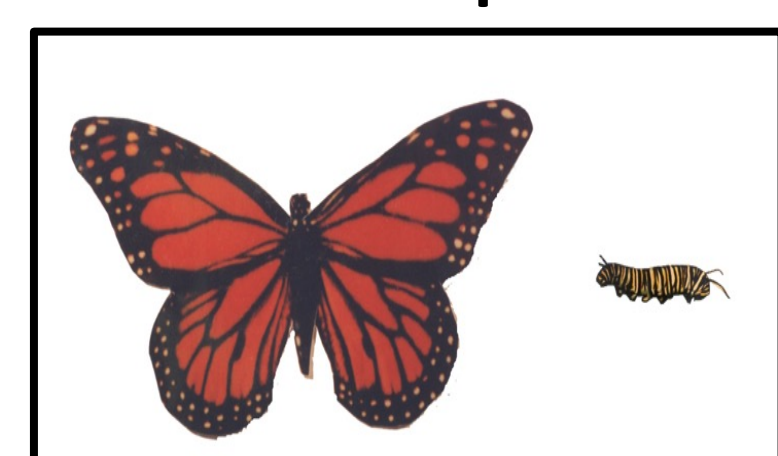
Change in species



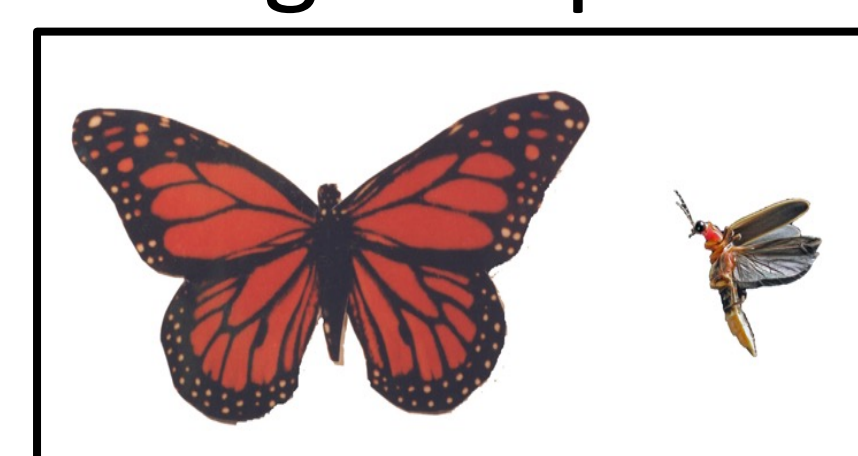
Change in size



Metamorphosis



Change in species



Method

Pretest

5 animals (3 insects)

- | | |
|----------------|--------|
| • Butterfly | • Fish |
| • Ladybug | • Dog |
| • Grey ladybug | |

Prime

Within-species variability prime:

Many Monarchs migrate **very long distances**, others **short distances** and some **do not travel at all!**

Between-species variability prime:

Monarchs travel long distances, but **Black swallowtails do not migrate at all.**

Control:

Kids can catch butterflies with a bug net so they **can see them closer to learn how butterflies look.**

Lesson

Same lesson about the metamorphosis of a ladybug. Children were randomly assigned to one of two diagrams.

Traditional lifecycle diagram:

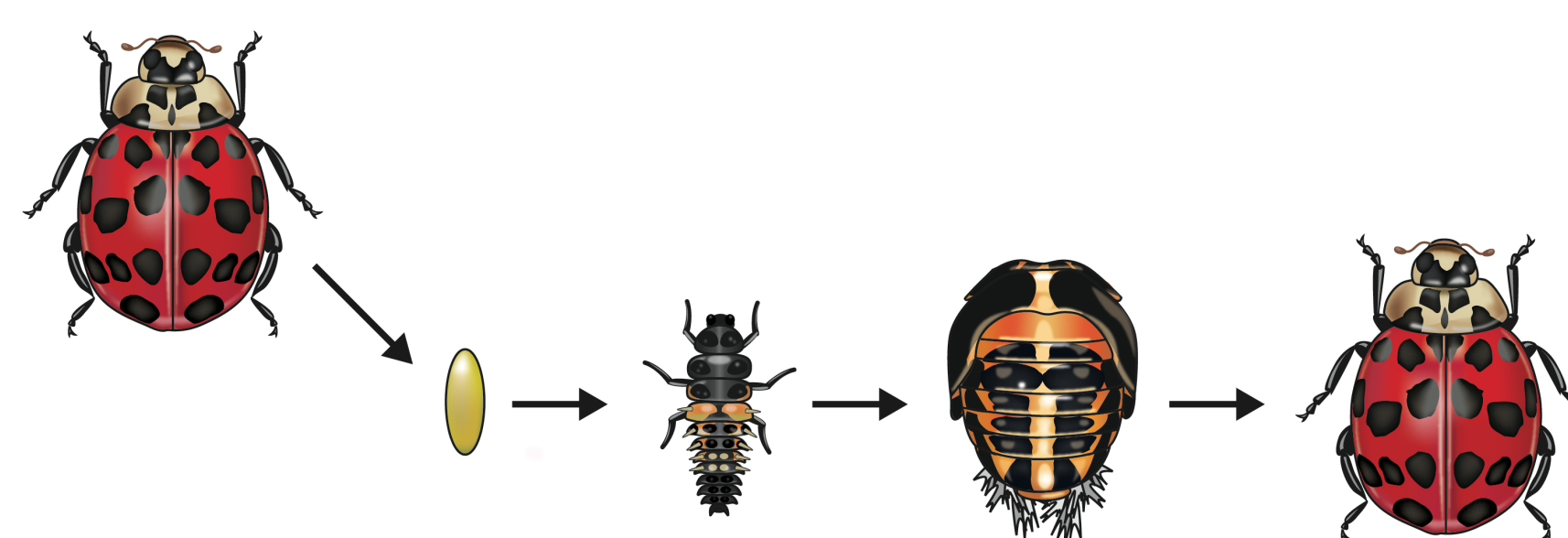
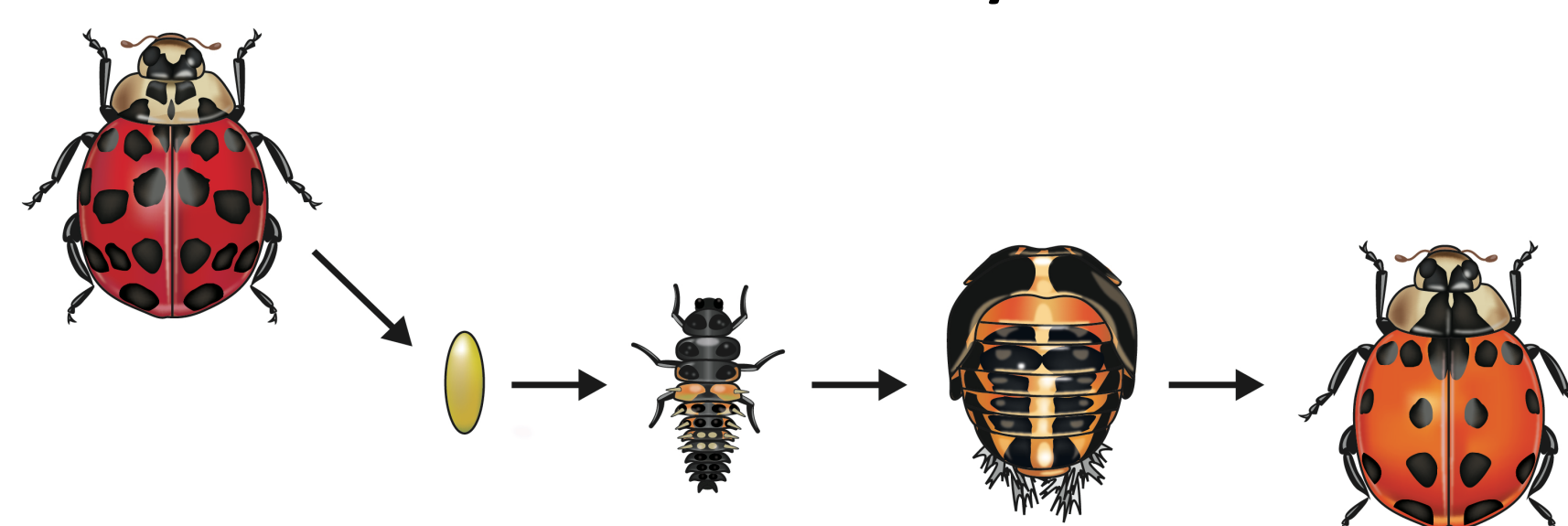


Diagram the shows variability:



Posttest

10 animals (7 insects)

- | | |
|------------------|------------------|
| • Ladybug | • Butterfly |
| • Orange ladybug | • Praying mantis |
| • Firefly | • Fish |
| • Stag beetle | • Frog |
| • Ant | • Dog |

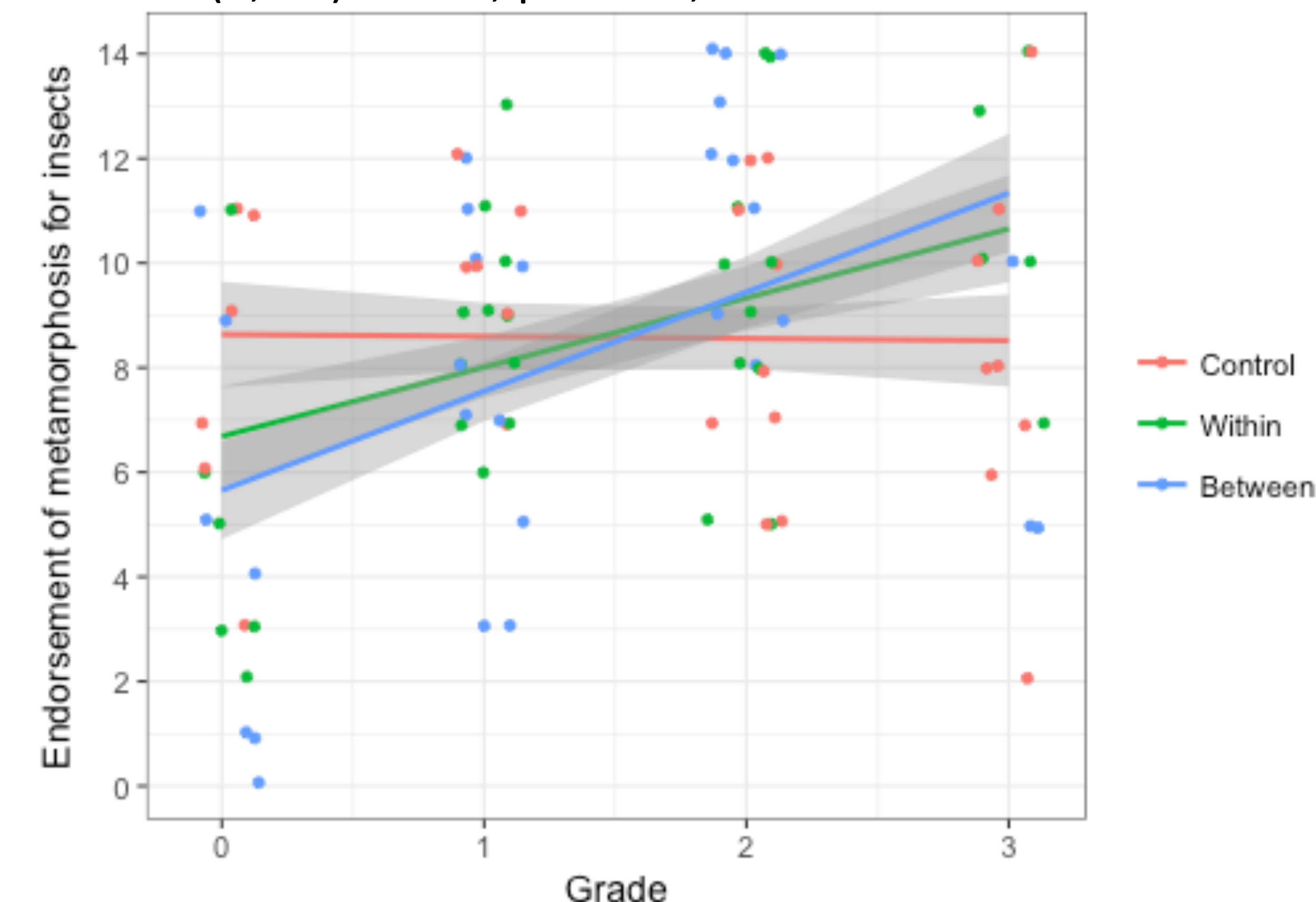
Results

Prime (within vs. control) x Grade:

$F(1, 83) = 3.24, p = .076, \Delta R^2 = .058$

Prime (between vs. control) x Grade:

$F(1, 83) = 6.19, p = .015, \Delta R^2 = .058$



Conclusion

- Priming students to think about variability leads them to get more out of a metamorphosis lesson, and this may be due to a reduction of essentialist thinking
- Future studies should investigate whether priming variability leads to better learning of other biology concepts

Acknowledgements

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