In 1963, Tinbergen revolutionized the study of animal behaviour by revamping the conceptual framework of the discipline. His framework suggests an integration of four questions: causation, ontogeny, survival value, and evolution. The National Research Council Committee on Undergraduate Biology Education to Prepare Research Scientists for the 21st Century (2003) suggests alignment between current research and undergraduate education. The purpose of this study, therefore, is to determine if the conceptual framework used by animal behaviour scientists, as presented in current primary literature, aligns with what students are exposed to in undergraduate biology education. After determining the most commonly listed textbooks from randomly-selected animal behaviour syllabi, four of the most popular textbooks underwent content analysis in order to determine the extent to which each of Tinbergen's four questions is being applied in education. Mainstream animal behaviour journal articles from 2013 were also assessed via content analysis in order to evaluate the current research framework. It was discovered that over 80% of the text covered only two of Tinbergen’s questions (survival value and causation). The other two questions, evolution and ontogeny, were rarely described in the text. A similar trend was found in journal articles. Therefore, alignment is occurring between primary literature and education, but neither aligns with the established conceptual framework of the discipline. Teaching an integrated framework is recommended in order to increase the number of scientists in the next generation that study evolution and ontogeny of animal behaviour; however, other curricular resources, such as primary literature from less mainstream behaviour journals, will be necessary.

To what extent do the conceptual frameworks of undergraduate biology education (i.e., textbooks) and primary literature for animal behaviour align with the established conceptual framework?

What is the conceptual framework of animal behaviour? Four Essential Questions Developed by Tinbergen (1963)

Causation
- How does the behaviour occur?
- What triggers the display of tail feathers in the male peacock?

Ontogeny
- How did the behaviour develop during an individual's life time?
- Is the peacock tail feather display a learned behaviour?

Survival Value
- How does the behaviour affect survival & reproductive success?
- Does the feather display impact # of mating opportunities?

Evolution
- Why did the behaviour evolve?
- Did the ancestor of the peacock also exhibit tail displays?

References