How hunting experience, habitat structure, and prey predictability jointly shape individual specialisation in predator foraging mode in an online videogame

Maxime Fraser Franco1, Francesca Santostefano1, Clint D. Kelly1, Pierre-Olivier Montiglio1

###### Groupe de Recherche en Écologie Comportementale et Animale (GRECA), Département des Sciences Biologiques, Université du Québec à Montréal, Montréal, QC, Canada

###### 1Correspondence: Pavillon des Sciences Biologiques (SB) SB-1805, 141 Avenue du Président-Kennedy, Montréal (Québec), Canada, H2X 1Y4

###### 1Corresponding author: maxime(dot)fraser(dot)franco(at)hotmail.com

# Abstract

This is my abstract paragraph

Keywords: individual variation, hunting success, plasticity, learning, prey predictability, online videogames

# Introduction

Individual variation in predator foraging behaviour is increasingly recognized as a major driver of trophic interactions and community dynamics [sources]. Recently, ecologists have began to hypothesise that there may be a functional relationship linking individual foraging specialisation to specialisation in resource consumption (i.e. niche specialisation) [sources: Toscano et al. 2016, etc]. One of the postulates of this hypothesis is that predators need to develop specific foraging tactics that are fine tuned to specific prey attributes [sources: Phillips, Woo, etc.]. For instance, predators species often use stereotyped hunting techniques required to capture the type of prey they encounter, such as (dauphins, orcas, etc) [sources : Woo, Estes, tinker, etc]. However, it remains largely unclear how extrinsinc and intrinsinct factors interact to shape these individual-level processes. Therefore, we still have limited knowledge on the ecological consequences of individual foraging and diet specialisation. An important question that remains unanswered is how generalist and specialist individuals can coexist within predator populations. If foraging and resource specialisation can help maintain community stability by promoting species coexistence [sources: bolnick, araujo, wolf, etc], it is crucial that we develop studies that integrate the causes and consequences of these two individual components.

A number of long-term studies have observed similar fitness related measures generalist and specialist individuals [sources: à partir de Woo]. An emerging explanation is that temporal fluctuations in the predictability of resources (abundance, availability, behaviour) may favor one or the other strategy depending on time scales [sources : Woo, Phillips, Ceia, etc]. The resource-predictability hypothesis advances that when resources are predictable, particularly on short time-scales, individual specialists should benefit from higher fitness returns. The rationale behind this prediction is that individuals should have higher prey delivery rates when they repeatedly employ the same foraging technique as it is easier to assess prey predictability over shorter time-scales. In contrast, individual generalists should be advantaged over longer time scales as resource parameters are expected to fluctuate.

Hunting experience and age have been proposed as major potential drivers of the relationship between foraging specialisation and resource use [sources]. Learning how to hunt is crucial for young predators to reach adulthood and survive.

(learning optimises return rates or foraging success) (par contre, décomposer l’âge de l’expérience est difficile, et particulièrement chez des espèces sur le terrain puisque ça peut impliquer des techniques invasives) (parler des études qui ont montré que certains spécialistes étaient meilleurs, mais que c’était confondu par l’âge)

A second important driver of individual differences in predator hunting behaviour is related to habitat-specific features [sources, Kobler, parler de la ideal free distribution?]. Predators are expected to adjust their foraging mode (ambush vs cursorial) to habitat structures that aid/impair (ex. perches, vegetation density) their vision, ability to hide, or energetic/time requirements. For instance, predators who ambush in closed and heterogeneous landscapes often switch to cursorial hunters in open and homogeneous landscapes [sources]. (Donner exemple des orcs)

Several studies have shown that individual specialists can outperform

* Paragraphe 1 (effet de la taille, du sexe, et importance du foraging mode)
* Paragraphe 2 (importance des proies (woo et al.) et de l’habitat)
* Paragraphe 3 (importance de l’expérience et comment c’est un rôle probable mais encore inexploré) (sources Weimerskirch, 2005, 2007)
* Paragraphe 4 (système qu’on utilise) (jeux vidéo : paragraphe le + court possible)
* Paragraphe 5 (objectifs et hypotèses)