**Study 3**

 In Study 3, we examined the theoretical proposition that the information-knowledge gaps evolve in direct response to long-term changes in accumulated knowledge and skill to reflect learner perceptions of their current capabilities relative to available novelty in the environment.

**Method**

 ***Study context.*** Paramotoring is a form of ultralight aviation where the pilot wears a back-mounted motor, which provides the necessary thrust to take off from the ground and fly when attached to a paraglider. In the United States, paramotoring is minimally regulated and requires no license or formal training. However, paramotoring can be dangerous when practiced without proper training. Thus, many paramotor pilots elect to seek formal instruction from schools where techniques for handling the equipment, launching, and basic aviation weather knowledge are taught. Nevertheless, due to the sport’s unregulated nature, many pilots elect to forgo the cost of this training and gain the knowledge and skill necessary for flight on their own.

The loosely regulated nature of paramotoring means that learning effort-allocation decisions are largely the purview of the individual pilot in command. In this regard, the autonomous nature of decision-making processes within this context mirrors the learning in performance-based contexts in organizations. Moreover, there is a great deal of variability among paramotor pilots regarding their accumulated experience in the sport. As such, we believe this context provides an excellent opportunity to examine theoretical links between accumulated experience, information-knowledge gaps, and perceived knowledge and skill.

***Participants and procedure.*** Links to an online survey were advertised in online communities of paramotor pilots where both instructor-trained and self-trained pilots frequently gather to share experiences and discuss topics related to the sport of paramotoring. Furthermore, links to the survey were distributed to instructors at paramotoring schools across the US with the request to share the survey broader with the instructor’s current and previous students and within individuals that comprise their various networks. The survey link routed participants to an informed consent, followed by the survey itself, which took approximately 10 minutes to complete. In total, 128 paramotor pilots responded to the survey. Experience among pilots within the sample ranged from 1 month and 0 solo flights logged to 37 years and over 3000 flights logged. Consistent with the demographics commonly observed within this sport, the sample was predominately males (%male = 98%) between the ages of 35 and 55 years old (*M*age = 42.71, *SD*age = 12.57), although responses were acquired from pilots as young as 19 years old and as old as 76 years old. 79% of respondents identified as instructor trained, and 21% of pilots identified as self-trained. In exchange for participation, infographics reporting basic demographic and survey findings of interest to the community were shared within these same outlets.

**Measures**

 ***Objective paramotoring experience.*** It is a standard practice among paramotoring pilots to keep flight logs of each flight. As such, pilots were asked to refer back to their flight logs and report (1) how much time had passed since they first started learning to fly paramotors, (2) how many hours of flight time they had logged to date, and (3) how many total solo flights they completed since they began flying.

***Information-knowledge gaps.*** A 2-item scale was used to measure the magnitude of perceived information-knowledge gaps. This first item asked pilots to estimate “what percentage of all there is to know about the sport of paramotor do you still need to learn?” The second item asked, “what percentage of skills applicable to the sport of paramotor do you still need to acquire?”

***Perceived knowledge and skill.*** A 2-item scale was used to measure the magnitude of a pilot’s perceived knowledge and skill relative to other paramotor pilots. The first item asked, “on a scale from 0 (well below average) to 100 (well above average), how would you rate your level of knowledge in the sport of paramotor compared to other paramotor pilots?” where a 50 represents an average level of knowledge compared to other paramotor pilots. The second item asked, “on a scale from 0 (well below average) to 100 (well above average), how would you rate your level of knowledge in the sport of paramotor compared to other paramotor pilots?” where a 50 represents an average level of skill compared to other paramotor pilots.

**Results**

***Measurement model.*** Descriptive statistics and intercorrelations for Study 3 can be found in Table 6. Independence of study variables was tested using a confirmatory factor analysis (CFA) in which the fit of a three-factor model comprising the information-knowledge gaps, perceived knowledge and skill, and objective experience items all loaded onto individual factors was compared with two alternative models. In the first alternative model, items measuring objective experience and perceived knowledge and skill were combined into a single factor, forming a two-factor model with information-knowledge gapss. In the second alternative model, all items were specified to load onto a single factor. Model fit was evaluated using fit indices recommended by Hu and Bentler (1999). The three-factor measurement model showed good fit (χ2[11] = 21.50, Tucker-Lewis index (TLI) = .97, comparative fit index (CFI) = .98, standardized root-mean-square residual (SRMR) = .037) and fit the data significantly better than both alternative models (two-factor model: Δχ2[2] = 108.71, *p* < .01; one factor model: Δχ2[3] = 167.50, *p* < .01).

 **Hypotheses tests.** Data were analyzed using structural equations modeling and mediation analyses in Mplus (Version 6.12, Muthén & Muthén, 2010). In Hypothesis 9, we predicted that accumulated experience in a domain would be negatively related to the magnitude of perceived information-knowledge gapss and that this relationship would be mediated by one’s perceived accumulated knowledge and skill within that domain. As shown in Figure 6, Hypothesis 9 was supported. Prior experience had a strong, negative, linear relationship with the magnitude of perceived information-knowledge gapss (total effect = -.169, *p* < .01; *β* = .49). Furthermore, this relationship was fully mediated by the pilot’s perceived accumulated knowledge and skill (indirect effect = -0.14, *p* < .01; *β* = -0.41, remaining direct effect = -0.03, *p* > 05; *β* = -0.08).

**Study 3 Discussion**

The results of Study 3 suggest that the theoretical rationale underlying the role of the information-knowledge gaps in the learning process likely generalizes to learning that occurs over a long period of time in non-laboratory settings. Specifically, we found that more experienced paramotoring pilots were more likely to perceive a greater amount of accumulated knowledge and skill than novice pilots. In turn, this accumulated knowledge and skill led experienced pilots to perceive smaller information-knowledge gapss than their novice counterparts. Furthermore, the magnitude of the effects observed in Study 3 support arguments in favor of the centrality of the information-knowledge gaps as a regulatory mechanism operating within self-regulated learning contexts.