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a contribution of the SEQ process when producing a sequence with multiple rather than a single key press. Importantly the similarity in the nature of the sequence length effect for individuals with AOS and controls suggests the SEQ process was intact for individuals in AOS. In contrast, two particular findings provide initial evidence for a disrupted INT process in AOS. First, the preparation of a long as opposed to short duration single key press was significantly greater for individuals with AOS which remained throughout practice. While this was true in the initial trials for the control participants, this cost was quickly minimized. Second, AOS displayed significantly greater delays when asked to prepare sequences that involved preparing both long and short duration elements compared to being required to prepare only one duration. Again, such delays were rapidly reduced and disappeared by the end of practice for the age-matched and young controls. The implications of these data for current therapeutic protocols for individuals with AOS will be addressed.

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2.1.3 Effects of response stimulus intervals and target size in an aiming movement version of the serial RT task

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Implicit learning, the ability to acquire knowledge in the absence of the capacity to verbally express what was learned, has been under investigation for over 35 years. An experimental task that is well-suited to study the acquisition and use of implicit knowledge is the serial reaction time (serial RT) task. This task typically involves successive keypresses, but the present study addressed whether participants develop and use implicit and explicit sequence knowledge also when aiming movements are used instead of key presses. Participants practiced a version of the serial RT task in which they repeatedly cycled through a fixed series of 12 successive aiming movements. Each movement involved tapping a target on a touch sensitive screen. There were six alternative targets located on the perimeter of an imaginary circle and the response to stimulus interval (RSI) amounted to 200 ms. Half the participants tapped 9 mm targets and the other half tapped 24 mm targets. A subsequent test phase examined performance with

the familiar and a random sequence; with blocked RSIs of 0, 200 and 400 ms. The results demonstrate that in the serial RT task implicit and explicit sequence knowledge develop and are used when aiming movement are used. However, even though movement time was longer with small targets, these longer movement times did not affect the development and expression of implicit and explicit knowledge. Detailed analyses suggest that implicit knowledge had its effect during the preceding movement, whereas explicit knowledge was used primarily after the preceding movement had been completed. In conclusion, in the present study target size appeared to determine the time required for hitting targets but this did not affect the development and expression of implicit and explicit knowledge. Explicit knowledge can be expressed better as RSI increases, indicating that explicit knowledge is used primarily after the preceding movement has been completed, while the absence of an RSI effect on the expression of implicit knowledge suggests that implicit knowledge has its effect during the preceding movement.

Key references

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2.1.4 Anticipatory control of response conflict in a sequence-learning task

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Acquired motor sequences, such as in Piano playing, can be performed on the basis of memory. However, learning such sequences usually requires strong stimulus support. The present study investigated the process of learning motor sequences using a serial reaction time (RT) task, in which subjects respond manually to visual stimuli. Sequence-specific learning in such a task is indicated by shorter RTs in predictable relative to unpredictable sequences. It was as-