Plasticity of Intelligence

Prior research on cognition and aging has been focused on comparing young and old adults and assuming that midlife adults fall somewhere in between. But some abilities may decrease while others improve during midlife. The concept of plasticity means that intelligence can be shaped by experience. Intelligence is influenced by culture, social contexts, and personal choices as much as by heredity and age. In fact, there is new evidence that mental exercise or training can have lasting benefits (National Institutes of Health, 2007). We explore aspects of midlife intelligence below.
**Formal Operational and Post-formal Intelligence**

Remember formal operational thought? Formal operational thought involves being able to think abstractly; however, this ability does not apply to all situations or subjects. Formal operational thought is influenced by experience and education. Some adults lead patterned, orderly, lives in which they are not challenged to think abstractly about their world. Many adults do not receive any formal education and are not taught to think abstractly about situations they have never experienced. Nor are they exposed to conceptual tools used to formally analyze hypothetical situations. Those who do think abstractly, in fact, may be able to do so more easily in some subjects than others. For example, English majors may be able to think abstractly about literature, but be unable to use abstract reasoning in physics or chemistry. Abstract reasoning in a particular field requires a knowledge base that we might not have in all areas. So our ability to think abstractly depends to a large extent on our experiences.

Post-formal thought continues: As discussed previously, adults tend to think in more practical terms than do adolescents. Although they may be able to use abstract reasoning when they approach a situation and consider possibilities, they are more likely to think practically about what is likely to occur.

**Increases and Decreases**

**Tacit knowledge** (Hedlund, Antonakis, and Sternberg, 2001) increases with age. Tacit knowledge is pragmatic or practical and learned through experience rather than explicitly taught. It might be thought of as “know-how” or “professional instinct.” It is referred to as tacit because it cannot be codified or written down. It does not involve academic knowledge, rather it involves being able to use skills and to problem-solve in practical ways. Tacit knowledge can be understood in the workplace and by blue collar workers such as carpenters, chefs, and hair dressers. These occupations and cognitive skills are the subject of the book, *The Mind at Work, by Mike Rose*. Read an interview with Rose [HERE](https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Human_Development_Life_Span_(Overstreet)/9%3A_Middle_Adulthood/9.3%3A_Cognitive_Development).

Verbal memory, spatial skills, inductive reasoning (generalizing from particular examples), and vocabulary increase with age as well (Willis and Shaie, 1999). You may have heard that wisdom comes with age. However, wisdom may be more of a function of personality than cognition. Those who exhibit wisdom in midlife, may have made wiser choices at younger ages as well.

The mechanics of cognition such as working memory and speed of processing gradually decline with age but can be easily compensated for through the use of higher order cognitive skills such as forming strategies to enhance memory or summarizing and comparing ideas rather than relying on rote memorization (Lachman, 2004). Further, the declines mentioned above may diminish as new generations, equipped with higher levels of education, begin to enter midlife.

**Learning in Older Adults**

Midlife adults in the United States often find themselves in classrooms. Whether they enroll in school to sharpen particular skills, to retool and reenter the workplace, or to pursue interests that have previously been neglected, these students tend to approach learning differently than do younger college students (Knowles, Horton, & Swanson, 1998).
An 18 year-old college student may focus more on rote memorization in studying for tests. They may be able to memorize information more quickly than an older student, but not have as thorough a grasp on the meaning of that information. Older students may take a bit longer to learn material, but are less likely to forget it quickly. Adult learners tend to look for relevance and meaning when learning information. Older adults have the hardest time learning material that is meaningless or unfamiliar. They are more likely to ask themselves, “What does this mean?” or “Why is this important?” when being introduced to information or when trying to concepts or facts. Older adults are more task-oriented learners and want to organize their activity around problem-solving. They see the instructor as a resource person rather than the “expert” and appreciate having their life experience recognized and incorporated into the material being covered.

This type of learning is more easily accomplished if adequate time is allowed for mastering the material. Keeping distractions at a minimum and studying when rested and energetic enhances adult learning. Androgogy is a type of teaching that considers the needs of adults (versus pedagogy which was originally geared toward teaching children).

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**Gaining Expertise: The Novice and the Expert**

When we work extensively in an area, we may gain expertise. Some areas of expertise develop after about 10 years of working in a field. Some gain expertise after a shorter period of time. Consider the study skills of a seasoned student versus a new student or a new nurse versus an experienced nurse. One of the major differences is that the new one operates as a novice while the seasoned student or nurse performs more like an expert. An expert has a different approach to learning and problem-solving than does a novice or someone new to a field. While a novice tends to rely on formal procedures or guidelines, the expert relies more on intuition and is more flexible in solving problems. a novice’s performance tends to be more conscious and methodical than an experts. An expert tends to perform actions in a more automatic fashion. An expert cook, for example, may be able to prepare a difficult recipe but not really describe how they did it. The novice cook might rigidly adhere to the recipe, hanging on every word and measurement. The expert also has better strategies for tackling problems than does a novice.

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