May 08
1. Evaluate the role of intuition in different areas of knowledge.
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The Role of Intuition in Different Areas of Knowledge

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The basic definition of intuition, as I see it, is "instinctive knowing, without the use of rational processes, often referred to as a 'gut feeling'". As a woman, I find myself very intuitive. I rely heavily on my instincts, instincts which have often proven to be correct. The practicality of this instinct however is limited. I would not rely on my 'gut' feeling during an IB exam, for a certain degree of rational processing is indispensable; nonetheless, subject-specific intuitions are indeed common, which leads me to *redefine* the term 'intuition'. In terms of science, intuition could be seen as a process wherein the individual works on a problem subconsciously, while completing other tasks that bear no relationship to the truth they hope to reveal. Although intuition may play a role in various aspects of science, I will restrict my discussion of the role of intuition to the process of deriving a scientific hypothesis. In math, the ability to solve a mathematical problem through rapid cognitive processing could be perceived as intuitive. Finally, in order to evaluate the role of intuition in ethics, the standard definition of intuition, 'instinctive knowing', will be applied. Nonetheless, although intuition does play a crucial role in these three areas of knowledge, intuitive knowledge alone is not a valid source of knowledge.

People hold the firm belief that impressive scientific theories and laws have been reached through rational explanation, thereby overlooking the possibility of intuitive developments. Several scientific revolutions, or paradigm shifts, are in many cases the result of the intuitive instincts of notable scientists. In fact, Popper emphasized that there is no mechanical way of deriving a good hypothesis on the basis of observational data. The intuitive gateway is often opened through our dreams, as was the case for Otto Leowi. In 1903, Otto Loewi, a German physiologist, was confident in the idea that there existed a chemical transmission, rather than electrical transmission of the nervous impulse, yet he did not know how to substantiate his hypothesis. Seventeen years later, he had a dream

wherein he discovered an efficient method to determine whether or not his hypothesis was correct. It took nearly ten years to perform a series of tests to validate his theory, but ultimately the result of his dream became the basis for the theory of chemical transmission of the nervous impulse (Scientists Dreams). Intuitive science is thus the application of intuition to the development of new scientific ideas and theories. Seeing as intuition cannot be accepted on its own, particularly in an area of knowledge as complex as science, the scientist then uses a more verifiable way of knowing, reasoning, to rationalize his intuitive ideas and impressions which may develop into empirically testable and falsifiable hypothesis. Nonetheless, scientists must be very careful with this intuition for if the premise is false and yet substantiated, the knowledge that evolves from it will accordingly be false.

However, it must be noted that these intuitive discoveries seem to only occur when you possess the right background knowledge and a strong emotional focus to unravel a particular matter; since I sadly do not possess this 'expert intuition', I by no means expect to find a vaccine for the HIV virus any time soon. Some scientists, however, argue that there is no intuition involved when arriving at a theory because intuitive instincts lead to confirmation bias, wherein scientists are so swayed by their intuitive instincts, that they reject any data that may falsify their theory, on the grounds that it is an experimental error. Also, we have to be very careful with our natural intuitions; the aim of education after all is to help rid ourselves of naïve intuitions (Lagemaat 161).

Given math's reliance on intricate concepts that require thorough reasoning, most scholars contend that intuition and math must be placed on two opposite sides of the spectrum. Last February, I most certainly would not have questioned the scholars' belief;

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as an accomplished TOK student, however, I now find myself disagreeing with their view. Although the role of intuition is not as predominant in math as it is in scientific hypothesizing, its importance must be acknowledged. Have we not all been dumbfounded upon witnessing the math class 'genius' readily answer a question, only to be disappointed to find out that he can't explain to us *how* he got his answer, because the answer just '*hit him'?* If intuition is defined as a rapid cognitive process without a sense of developing a structured mathematical rigor, then the student's ability may be regarded as intuitive. According to an IB Higher Level Math teacher, Dr. Hall, this intuition is obviously not the result of any random 'gut feeling', but rather, the student's ability to perceive patterns intuitively without a conscious process of understanding those patterns (Robert Hall). This is precisely what happened to prolific mathematician Euler, who intuitively developed Euler's formula, $e^{i\emptyset} = \cos(\emptyset) + i\sin(\emptyset)$, a theorem that revealed a key relationship between trigonometric functions and the complex exponential function. Since Euler developed his formula intuitively, he was not able to explain the geometrical interpretation of the formula. It is only fifty years later, that Caspar Wessell was able to prove Euler's findings (Euler's identity). In effect, mathematical impressions must always be corroborated through a very rigorous logic, a logic often described as the most meticulous of any intellectual field. The concept is verified though a series of rules, which may then become postulates, and can then develop into a whole area of mathematics. This verifying process can be likened to the three tests of truth, wherein the math must cohere with other proven concepts, it must be pragmatic in the sense that it must work when put into practice, and finally, it must correspond to other proven mathematical concepts.

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Beyond a doubt, the most perceptive mathematicians have an intuition for mathematics which permits them to promptly recognize when a result fits into the reasonable context of a theory. Math is based on a reasoning derived from stated premises known as axioms; as long as these are valid, and we don't make mistakes in our reasoning, the results have to be correct. Yet it must be remarked that these axioms apply to an ideal world, not the real one in which lines are made of atoms with a finite size, and 'space' may be curved by gravity, and so on (Mathematics and Intuition). Indeed there are cases in which the results obtained are wrong not because the math itself was wrong, but because it was applied to an incompletely understood reality (Mathematics and Intuition).

In light of the fact that ethics in part determined by emotional response, most students may be tempted to argue that it is in fact the area of knowledge that relies most heavily on intuitive thinking; such reasoning, in my opinion, is far too simplistic. I believe that our moral judgments are based on elaborate processes of socialization whereby we acquire our moral foundation through the testimonies of the main sources of authority in our lives, such as our parents, teachers, priests, imam's, etc. This socialization, when combined with our emotional sensibility, allows us to be particularly in tune with detail, an acuteness which we often confuse with our intuition. My friend claims that she has an amazing intuition. When I ask her why, she replied: "*Since the very first day of school, I always had this 'gut feeling' that Kenza didn't appreciate me, despite her claims otherwise. Last week, as I was entering science class, I overheard her telling David that she cannot stand me!*" When I asked my friend what was the basis of this intuition, she gave me a confused look and replied: "*Uh, I don't know, the way she stared at me from head to toe?*" My friend is a perfect example of how we mistake our keenness to detail with intuition; her alleged intuition was simply

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specialized insight into a circumstance based on a prior experience. When a girl consistently stares at you "from head to toe", you assume that she holds strong feelings against you. However, if my friend had never been taught that the act of staring 'from head to toe' is in fact an indication of dislike, my friends would not have 'intuitively' suspected any tension between her and Kenza. Carl Jung would undoubtedly refute this theory, for his concept of collective unconscious maintains that we inherit the morality of a society from past generations, thereby explaining why a four year old knows that it's wrong to choke his baby brother (Morris 67). I find it hard to accept Jung's theory; given the randomness of the human element in an area like ethics, it appears rather nonsensical for a social scientist to arrive at such a bold deduction.

After having completed a thoroughly investigation of the role of intuition in different subject areas, it appears to me that its importance has been understated. Ironically, we tend to merely acknowledge the role of our intuition in ethics, yet it can be argued that is in fact the area that relies least on intuition. If we take a broad view of the meaning of intuition rather than regarding intuition purely as a sixth sense, we conclude that indeed it does play a large role in subjects often considered to be derived entirely from reasoning. Beyond a doubt, we cannot rely on intuition on its own, just as we cannot exclusively rely on any other way of knowing, for sources of knowing must always be tested against each other when we try to arrive at truth. It is certainly not the enemy of reasoning, for as I have demonstrated, the two can and do coexist.

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