



Article

Holistic View of Intuition and Analysis in Leadership Decision-Making and Problem-Solving

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Abstract: Making decisions is a key task for leaders and managers. Senior leaders are currently exposed to increasing amounts of data which they must process quickly in our current dynamic world. Complex factors in the business world are not always best approached through an analytical framework. Using tacit knowledge gained through intuition can enable a more holistic understanding of the deep nature of today's problems. This paper takes an expansive view of decision-making with intuition right at the centre and canvasses understandings of intuition arising from philosophy, psychology, Western and Eastern beliefs; and proposes a model that relates intuition to other problem-solving approaches. The paper presents the results of interviews with senior leaders who must make difficult decisions in complex turbulent environments. The interview schedule is based on questions raised in a prior literature search concerning the relationship between intuition and analysis in complexity decision-making and problem-solving, the usefulness to this group of respondents, the possibilities of combining both approaches and any conflict arising from that combination, and understandings of the concept of intuition by these respondents. The resultant model presents a visual description of a process that moves from exterior assessment achieved via sensing and analysis, through to deeper understandings and a more holistic discernment gained through intuition. The model has the potential to assist leaders faced with difficult-to-solve problems in providing a better understanding of the steps involved in tackling problems of increasing levels of complexity.

Keywords: intuition; analysis; leadership; decision-making; problem-solving; complexity



Citation: Hallo, Leonie, and Tiep Nguyen. 2022. Holistic View of Intuition and Analysis in Leadership Decision-Making and Problem-Solving. *Administrative Sciences* 12: 4. <https://doi.org/10.3390/admsci12010004>

Received: 1 December 2021

Accepted: 22 December 2021

Published: 27 December 2021

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1. Introduction

There is a long history of debate over issues such as the differences between these intuition and analysis, their relationship with each other and their optimal application (Orlandi and Pierce 2020). These literatures overlap with discussions about the role of emotion in people's lives. Decision-making and problem-solving are apt domains for exploring intuition in comparison with analysis-based decision-making. Decision-making in psychology has been studied both experimentally and in the real world, using both quantitative and qualitative approaches. Intuition remains a fascinating topic for academics and practitioners alike. The idea that there are two different ways of thinking, variously labelled, is a mainstay of theorising in the field of thinking and decision-making (Hodgkinson and Sadler-Smith 2018). This idea has also been popularised by several publications including Malcolm Gladwell's book "Blink" (Gladwell 2006). There is a widespread belief that people can use both types of thinking to a greater or lesser degree. Some people incline towards analysis and others towards intuition; this is open to modification. One's initial inclination is no doubt the result of many factors, both personal and environmental.

Exactly what constitutes intuition, its nature, and features, has stimulated much discussion within the fields of philosophy, psychology, and organisational behaviour. Broadly, intuition is conceived of as being unintentional, automatic, effortless, uncontrollable, unconscious, and rapid. This contrasts with analysis, which is conceived of as intentional, controllable, more effortful, conscious, deliberative, and slower. The typology of [Evans \(2008\)](#) groups various attributes of the two types under four clusters of consciousness, evolution, functional characteristics and individual differences. The cluster of evolution reflects the concept of intuition as being evolutionarily old and non-verbal, shared with animals, as opposed to analysis, which is perceived as recent, uniquely human and linked with language.

Exhortations to override intuition with analysis are often found, based on the belief that rational analysis will always give a better result, a belief which is strongly rejected by many ([Julmi 2019](#)). At the same time there are those who believe that intuition is a superior method for solving difficult problems. This paper investigates the use of intuition by senior leaders and their perceptions of its value and accuracy in comparison with analysis. Literature surveys of intuition were followed by interviews with senior business leaders. Finally, a model was developed to assist senior leaders to understand the potential of these two approaches under conditions of complexity such as now frequently experienced and the particular value of intuition in reaching an all-encompassing solution.

Intuition is fascinating because it seems to come out of nowhere, as in a feeling that “I just know that is not right”. There are many quotations leveraging one or the other approaches, often in favour of intuition as a better way to access fundamental truth. Poets, authors, and philosophers have considered the relative value of these two different ways of thinking, often concluding that intuition enables a more complete grasp or understanding. Plato defined intuition as: “The act of reason resulting from self-knowledge. Intuitive learning is the most perfect way to learn”. Herbert Simon noted: “... We cannot of course rule out the possibility that the unconscious is a better decision-maker than the conscious.” ([Simon 1956](#)). The relationship between intuition and emotion has also been explored. Famous author Dale Carnegie said: “When dealing with people, remember you are not dealing with creatures of logic, but with creatures of emotion ... ” ([Carnegie 1936](#)). Oscar Wilde (1890) said in his book “The Picture of Dorian Gray”: “I do not want to be at the mercy of my emotions. I want to use them, to enjoy them, and to dominate them.” This dichotomy of intuition and analysis clearly holds valence for many thinkers and academics.

Research Question 1: How do senior business leaders describe their use of intuition in terms of strengths and shortcomings in comparison with analysis?

Research Question 2: What is the relationship between analysis and intuition in addressing difficult problems?

2. Literature Review

2.1. *Conceptions of Intuition and Analysis from Psychology and Organisational Behaviour*

There is no widely accepted definition of intuition in the psychological literature. [Epstein \(2010\)](#) comments: “There are few phenomena in the history of psychology that have so many different definitions as intuition.” However, there are several common threads: that intuition is rapid, unconscious, although often manifesting consciously as emotion, at least partly not conscious, as its origin is often unknown and justification uncertain. Other ideas are that intuitive beliefs are not open to doubt and are useful in situations where there is a need for rapid assessment and a shortage of information. Decision-makers who use intuition often have a deep conviction that their decision is correct ([Bas et al. 2019](#)). Early psychological studies of decision-making reflect the Western obsession with rationality ([O'Connor 2014](#)). More recently there has been a shift in orientation towards a greater acceptance of intuition in decision-making and problem-solving, and many authors have demonstrated that leaders in organisations do indeed often use intuition, particularly in fast changing environments ([Sadler-Smith and Sparrow 2008](#)). This has been shown to

be the case even though organisations may favour or require specific analytical processes based upon business intelligence and big data (Constantiou et al. 2019).

2.1.1. Dual Process Thinking

The way in which analysis and intuition relate to each other has evoked vast literatures. Dual process thinking is a dominant view within psychology, which proposes that we can process information in two different ways, one that is conscious and rational and another that is subconscious and nonrational. These systems are generally viewed as two parallel cognitive and complimentary systems (Epstein et al. 1996). Whatever the labels used, this idea that we have two different ways to approach decisions is supported by most writers in the field. It has even been suggested that an attraction towards a dual approach is an expression of people's natural wish to find binary distinctions (Melnikoff and Bargh 2018), as are evident in such concepts as nature versus nurture, Yin and Yang, and good versus evil. Most writers in the field now accept that these are independent constructs and not opposite ends of a continuum (Wang et al. 2017). A major argument in this domain concerns whether analysis is superior to intuition. One position is that while intuition can give a quick default solution, analysis is needed as an arbiter to accept or reject that decision. A different view is that these two processes operate in parallel and compete. Conflict is resolved as necessary (Akinci and Sadler-Smith 2020), through processes of integration and compromise. Yet, others suggest that intuition is superior under conditions of complexity (Pretz 2008). Certainly, many authors have written about the limits of analytical linear processes in human judgement (Sinclair et al. 2009).

2.1.2. Heuristics and Biases

The idea that intuition comes easily and automatically with little effort and can be prone to errors is behind one common conception of intuition as an inferior decision-making method. One explanation of this view may be that because we are bombarded with messages in our information-rich world, we cannot think carefully about everything all the time. We often operate on automatic, and we are so-called "cognitive misers" (Nicholson and Bennett 2017). People often make the minimal effort required to do a job because thinking is hard work and can be aversive (Toplak et al. 2014). There is no doubt some truth in this. Tversky and Kahneman (1974) set up a very successful research program which came to define the understanding of intuition for many researchers in the field (Sadler-Smith and Sparrow 2008). This approach suggested that heuristics or rules of thumb introduce biases, and that these lead to errors of judgement. Some have argued against this conclusion: the ecological rationality view of Gigerenzer posits that better outcomes can occur with less information via an adaptive toolbox of strategies (Gigerenzer and Goldstein 1996).

2.1.3. Explorations of the Nature of Intuition in Psychology

In fact, intuition is far more than a useful shortcut. Intuition has important strengths, appearing spontaneously through gut feelings based upon experience or the sudden arrival of a solution without warning, or even through intuitive foresight (Sinclair 2011). Being often quick and effortless, it can give fast results without conscious awareness. Intuitive processes can incorporate learning and experience: most people will have had the experience of driving a car without being aware of it. The intuitive system is active in daily life, while analytical thinking only comes forward in specific times and places or when bidden (Sadler-Smith 2007). It may well be that intuition is often generating suggestions for analytical thinking in the form of impressions, intentions, and feelings, and that analytical thinking endorses these and turns them into beliefs and actions.

2.1.4. Expert Intuition/Gut Feeling/Body Sensations/External Cues

Expertise and intuition are tightly linked in the academic literature. One way in which intuition emerges is seen in recognition primed decision-making (RPD) models, in which

an experienced decision-maker can quickly recognise patterns, deploy appropriate action scripts and choose one (Klein 1998, 2003, 2011). Skilled and experienced decision-makers can use their knowledge including subconscious knowledge in a spontaneous way to produce accurate and suitable responses. Experts match the situation at hand to a prior experience using a sizing up process and produce a suitable action, and then evaluate the consequences of that action to imagine its result through a simulation process. They can quickly identify a response option and they are confident that it will work. They also may feel a sense of relief or enthusiasm (Khatri and Alvin 2000). Even in a novel situation, the experienced person can draw upon useful themes from unrelated events to produce an action plan. Data from the senses as well as affective cues such as an interoceptive state, as in feelings in the stomach, or a knowing state as in a hunch, or environmental cues, all of which are important and common, alert the person to their intuition and provide a quick and convincing reaction. We know when we are doing a good job. We also know when things are not quite right, and this kind of knowledge may come from bodily sensations or from external signals. Sensory cues from the body and the environment are interpreted in a process of sense-making with the possibility of intentionality (Dörfler and Bas 2020). This suggests that people can develop their intuiting ability. Intuitive knowing accessed in this way can contribute greatly to high level performance (Kandasamy et al. 2016). Hanif et al. (2020) investigated the utility of expert intuition within public sector leaders in a developing country, Pakistan. They commented on the relevance of such intuition for sustainable development. Expert intuition is now well accepted.

2.1.5. Intuition as Insight

Intuition can also occur through a process of insight, a sudden new understanding of a problem, sometimes accompanied by a solution. Whereas expert intuition or gut feeling is based on pattern recognition, insight intuition enables us to connect things in novel ways. This kind of intuition is often related to creativity (Koestler 1967). Many major scientific breakthroughs are thought to have arisen in this way, through insights which arrive suddenly seemingly without much effort (Cappon 1994). Often called the “aha experience” or the “Eureka effect”, it has also been termed “entrepreneurial intuition” (La Pira 2011). However, the idea that insight arrives without any mental effort is incorrect because the new insight arises after much thought about a problem. The intuiter can now connect pieces of the puzzle which were previously disorganised, and they can view the problem in a new way. As with expert intuition, the association of affect with the process can produce a positive emotional experience for the person (Shen et al. 2016).

2.2. Philosophical Understandings of Intuition

The discipline of philosophy sees intuition as a key concept. There is a long history of philosophical intuitionism in the West, beginning with the ancient Greek philosophers such as Plato and followed by later thinkers in the European tradition. Philosophical intuition is understood to be direct knowledge which can access the realm of natural law. The ancient Greek philosophers asserted two different modes of acquiring knowledge: an immediate, direct, and holistic way of knowing, which they called “noesis”, and analytical or discursive thought, which they called “dianoia”. The essential properties of these two different ways of knowing were presented by Henden (2004) as holistic, non-propositional, non-representational versus reductionist, propositional and representational. In the tradition of philosophical intuitionism, intuition is regarded as being superior to analytic thought and rational, because it allows us to access realms of pure reason and ultimate reality. Plato suggested that analytical thought is fallible because the deductive reasoning process is based upon unquestioned assumptions created by the observer (Westcott 1968). Ultimately, we need to see the inherent truth of something through the process of deductive reasoning and intuition is the basis for that deductive reasoning. Analysis, however, is largely built on a foundation of personal knowing.

The 20th century French philosopher Bergson (Bergson 1999) suggested that intuition enables us to directly understand the absolute. Through intuition we can place ourselves within an object instead of adopting an attitude towards that object. Bergson argued that intuition is the way of directly contacting reality rather than the patterned process which separates out and reduces discrete objects and processes into silos. Bergson suggested that in lower animals, instinct operates unconsciously without any awareness. The intellect of people is the source of self-awareness and judgement and therefore cannot completely grasp dynamic complex processes of prime reality. Only intuition enables us to grasp the essence of a thing in its entirety, as a whole. We need to free our mind from logic, reason and science and bypass the shield of the intellect to come to absolute truth.

The fundamental premise of these various philosophical understandings of intuition is the idea of a domain of ultimate reality which cannot be grasped through the senses or through the intellect. This is also a feature of some Eastern philosophies, including Buddhism. When one can transcend individual self-consciousness, one can arrive at a purer state of mind which is interpreted as ultimate reality. Identifying with the universal is the source of the highest knowledge and is called enlightenment. Identifying with one's senses, on the other hand, produce a dualistic state, in which we see ourselves as separate to the world, the opposite of enlightenment. Wang (2003) introduced the concept "systems intuition" as the core of oriental systems thinking style as described in ancient Chinese works and traditional philosophies, including the writings of Confucius. This author refers to a more primitive understanding of systems thinking which emerged several thousand years ago in China. Pan et al. (2013) also discussed differences between Western and Chinese views on the reductionism-holism debate and systems approaches in general, and concluded that while there are many commonalities, Western systems thinking tends to be focused upon using models to describe the problem, whilst Chinese systems thinking emphasises collective interests and flexibility, seeing systems thinking as reflecting harmony and unity through synthesis.

In summarising, the contribution of philosophy to our understanding of intuition holds consistencies between the ancient Greeks, Western and Eastern philosophical perspectives. Philosophical intuition can be viewed as a way of acquiring knowledge which is non-inferential, self-evident, and subjective. It is in this way incontestable. It can appreciate an ultimate reality. For these reasons, intuition is considered superior to analysis which is necessarily fragmentary. It can be seen that intuition bears a strong connection with elements of systems thinking, including recognising interconnections, understanding systems at different scales, and improving the mind's ability to grasp complexity (Arnold and Wade 2015). There have been limited attempts to align systems thinking and intuition in the complexity decision-making space, including using systems thinking as an aid to decision-making within the fields of medicine (Stolper et al. 2021), crisis management (Nelles et al. 2021) and COVID-19 response and recovery in the "new normal" (Haley et al. 2021).

2.3. How Do Intuition and Analysis Work Together?

Philosophy and psychology have viewed intuition and analysis in quite different ways but do accept that since both approaches are effective under certain circumstances, combining them would be useful. Empowering managers to move between these two ways of thinking would release potential and enable speed in decision-making in complex environments (Sinclair et al. 2009). Heskett (2010) proposed the concept of "rational intuition" to minimise the damage in high-risk decision-making, proposing that intuition should be based on both analysis and experience. Liebowitz (2014) talked about the need to develop senior leaders into "Informed Intuitants" who would rest their judgements on a combination of analytics and intuition. In an area where we do not have experience, then other sources of information will be necessary, be they intuitive or analytical.

Woiceshyn (2009) refers to the concept of "spiralling", consisting of iterative passes between intuition and analysis. First, integration of intuition with knowledge from experience allows zooming in on what seems to be the most feasible alternative. Next, analysis

can help to identify what is essential to the decision situation, rank options, and reach a tentative conclusion, followed by a third pass of testing out the tentative choice against alternatives or combinations thereof, followed by a final decision. [Darlow and Sloman \(2010\)](#) also discuss how intuition and analysis might interact, suggesting that intuitive processing is likely to begin automatically, while deliberative analysis may start at a later point, depending upon resources, motivation, and other factors. There may be many waves of interaction in which intuitions are analysed, cueing further intuitions and so on for many cycles.

[Akinci \(2014\)](#) presented results from interviews with experienced senior police officers who believed that their intuitive judgements were heavily influenced by their substantial learning and experience. These respondents used the terms intuition and gut feeling interchangeably. Intuitions appeared quickly and non-consciously and were strongly affectively charged. They also were very confident about these intuitions. The sharing of such feelings with others resulted in a collective intuition. The officers scanned for information and monitored the environment for cues. This author concludes that intuition and analysis should be used in a complementary fashion and that it is useful to be aware of intuitive judgements that appear automatically so that they can be captured. [Akinci and Sadler-Smith \(2020\)](#) posit an “Intuition-based Inquiry mode” in which cognitive resources and time are entrained to make sense of an intuition which conflicts with analysis. Intuition has mobilised curiosity and compelled people to act on their intuition, to persist and make sense of significant cues which suggested a conflict needing resolution. A feeling of unease has led to an effortful process of checking, probing, and persisting. There is a cyclic or spiralling iterative process to make sense of an ambiguous situation and reduce the resultant tension.

[Okoli et al. \(2016\)](#) examined the overlap between the two strategies, pointing out that the optimal sequence between these two approaches is not clear. Their studies indicated that their experienced respondents began with intuition as a default process. They scanned both internal and external sources for useful information and then filtered this into relevant cues. Validation occurred via analysis either through a mental simulation process or consulting with others. The initial intuition indicated where the subsequent analysis should focus. In a later study, [Okoli \(2020\)](#) investigated the use of intuition in complex crisis situations and the need for flexible and creative responding. They further comment “Seasoned experts are likely to approach difficult problems through an interplay of the intuitive and deliberative styles . . . ” ([Okoli 2020](#), p. 5). Intuition will be the primary default strategy with rationality used only as necessary. [Heino and Kalalahti \(2021\)](#) also commented on the use of expert intuition in critical high-stakes environment and noted that expert intuition was very valuable in being able to detect anomalies in a given situation, helping them to deviate from existing practices and policies when necessary.

2.4. Reconciling Conflicting Messages: The Use of Paradox

It has been suggested that analysis and intuition sit together in the manner of a paradox ([Keller and Sadler-Smith 2019](#)). The two essential elements in paradox are contradiction and interdependence ([Smith and Lewis 2011](#)). Contradiction arises because the elements do not conceptually fit together. Yet, the elements cannot be separated because they are two sides of the same coin. When we perceive opposing and conflicting yet interrelated paradoxes, we experience ongoing tension that is both cognitive and emotional.

Many authors have explored ways for organisational leaders to cope with and leverage paradoxes. [Smith and Lewis \(2011\)](#) proposed their dynamic equilibrium model as a way of better managing organisational paradoxes through enabling virtuous cycles using strategies of acceptance and resolution, viewing the tension as an invitation for creativity and an opportunity, rather than something to be avoided or suppressed. [Poole and Ven \(1989\)](#) present four methods: accepting the paradox and learning to live with it; resolving the paradoxes by spatial separation; temporal separation; and synthesis, which expands the assumptions behind each element of the paradox. Staying with the paradox, coping with

it and with the tensions therein may bring about dramatic shifts in understanding and behaviour. Paradoxical leadership involves holistic thinking such that the big picture is in the frame as well as the individual elements; a form of zooming in and zooming out (Schad and Bansal 2018; Zhang and Han 2019). Humour and the use of dramatic irony are often noted as a natural and useful response to paradox in the moment (Dubé and Robey 2009). Similarly, encouraging a playful attitude (Beech et al. 2004) may produce unexpected connections between divergent ideas or actions three paradox.

When intuition suggests one direction or behaviour and analysis suggests something different, there is a paradox that can lead to better outcomes. Intentionally embracing the paradox allows an ambidextrous approach with intuition and analysis working together, perhaps simultaneously, and produce more holistic synergies (Lewis and Smith 2014; Lüscher and Lewis 2008). Several authors have explored ways of exploring and exploiting this paradox to achieve better decisions. Repeatedly “switching cognitive gears” (Calabretta et al. 2017) is a way of using intuition and analysis together when intuition promotes analysis; analysis is added into the mix and fed back to intuition and a virtuous cycle is created. The cycle can also start with analysis. Staying with the paradox long enough and developing sufficient cognitive complexity may allow the emergence of meaning in the apparent contradictions, using strategies of acceptance and resolution. Acceptance means embracing the paradox as an unsolvable puzzle and living with it. The mindset of resolution can appreciate the distinctive benefits of the two types and use them separately, over either time or space, or accommodating both simultaneously.

The ideas of separating and bringing together are found again in the work of Keller and Sadler-Smith (2019) who suggest differentiating (recognising the distinctive benefits of each approach) and integration (finding linkages between intuition and analysis). Iteration is necessary because it is difficult to undertake both processes at the same time. When viewed through the lens of paradox, the synergies between intuition and analysis help decision-makers to improve their efficiency and effectiveness. Synergistic sequencing might mean intuition catalysing analysis or analysis catalysing intuition, and the making of connections will mean finding synergies and linkages which acknowledge the strengths of both poles.

Bridging the gap between intuition and analysis will require a new mindset. Ways of combining the two approaches have been considered in the literature and suggestions include cognitive flexibility, sequential switching, and holistic thinking. Table 1 below has been distilled from literature reviews and lists features of intuition and analysis and ways of combining them effectively. Integration and differentiation suggestions are presented for each feature. The features were selected based upon categorisations by Evans (Evans 2008; Evans and Stanovich 2013).

Table 1. Intuition vs. Analysis and the gap through paradox.

Feature	Intuition	Analysis	Bridging the Gap through Paradox
Consciousness	Unconscious (Evans 2008; Epstein 1994; Hogarth 2001), implicit, automatic (Hodgkinson and Sadler-Smith 2018), effortless and holistic, does not require cognitive effort, (Hogarth 2001), the product is conscious, but the process is not; unintentional and involuntary; can be conscious (Bas et al. 2019); experiential implicit learning (Epstein 1994), the process cannot be described (Dörfler and Ackermann 2012)	Conscious (Evans 2008), rational, explicit, controlled processing (Hodgkinson and Sadler-Smith 2018), volitional, intentional, requires cognitive effort. The decision-maker is aware of both the product and the process, we are in control of our thoughts (Salas et al. 2010; Evans and Stanovich 2013; Stanovich and West 2000; Darlow and Sloman 2010)	Since many decision-makers naturally rely upon analysis, it may be useful to bring intuition to consciousness, use it when you need to, devote time to it, learn to value intuition and an internal orientation, nurture and build confidence in your intuitive skills through feedback, keep track of your intuitions and intuitive insights (Hogarth 2001), learn to be more spontaneous (Sadler-Smith and Shefy 2004; Agor 1986), analysis and intuition should be used together (Akinci 2014)
Functional characteristics /properties	Associative connections (Epstein 2010; Laureiro-Martínez and Brusoni 2018), domain specific, contextualised, pragmatic, parallel, low effort, rapid, high-capacity (Evans 2008) default process (Epstein 2003), holistic (Allinson et al. 2000; Dörfler and Ackermann 2012), related to emotion (Sinclair et al. 2009) and “gut feeling” (Akinci 2014; Akinci and Sadler-Smith 2009), stimulates novel solutions (Miller and Ireland 2005) spontaneous, a-logical (Dörfler and Ackermann 2012), pragmatic (Evans 2008), sudden insight (Cappon 1994)	Intentional, effortful (Epstein 1991), slow, low capacity (Evans 2008), intellective (Pollock 1989), inhibitory, logical, analytic, sequential, reflective, reductionist (Robson and Cooksey 2008), rule-based, formal rules are used (Allen 2011), abstract, logical, resource intensive, limited capacity, can only consider a few attributes, responsive to verbal instruction (Epstein et al. 1996; Epstein 2010), mediated by conscious appraisal (La Pira 2011; Myers 2010), affect free (Sinclair et al. 2009)	Cognitive and behavioural flexibility (Zhang and Han 2019), encourage ability to adapt to various problems (Laureiro-Martínez and Brusoni 2018) and switching ability (Braem and Egner 2018). Employ a thoughtful balance of the two approaches (Kutschera and Ryan 2009). See the bigger picture: this can be developed, use a paradox mindset. Use big picture thinking as well as detail consciousness (Hodgkinson and Clarke 2007). Be “consistently inconsistent” (Schad and Smith 2019)
Individual differences	Universal, independent of general intelligence (Evans 2008), independent of working memory (Evans 2008), recognition of prior learning and experience, pattern recognition (tacit knowledge), preferred by experienced decision-makers, increases with seniority and age (Agor 1986) can be recognition primed by experience (Klein 1998, 2003) (Akinci and Sadler-Smith 2009; Simon 1987), the default method for experienced people (Dörfler and Bas 2020)	Heritable, linked to general intelligence (Evans 2008), limited by working memory capacity (Akinci and Sadler-Smith 2009; Darlow and Sloman 2010; Laureiro-Martínez and Brusoni 2018)	People tend to have a default style (Selart et al. 2008). Be aware of your preferred method of decision-making and commit to practising and using your less preferred approach (Hodgkinson and Clarke 2007). Extend thinking to include intuitive approaches which are available to everyone; seek integrative solutions. Look for new ways of combining and integrating diverse perspectives (Zhang and Han 2019); allow intuition to catalyse analysis and allow analysis to catalyse intuition; both differentiate and integrate (Keller and Sadler-Smith 2019)
Method of problem-solving	Generating novel approaches, holistic (Hogarth 2001), associative connections (Epstein 2010), considering the whole problem, inductive approach, the context is important, domain specific, directness of knowing, non-linear, nonsequential (Sinclair and Ashkanasy 2005; Evans 2006; Sheffield et al. 2017), understanding without judgement, inside knowledge (Westcott 1968)	Rule-based, cause and effect relationships (Epstein 2010), deliberative, divide the problem into parts and analyse them separately in a rational and linear way, deductive approach, systematic analysis, hypothetical, abstract, context is not important, domain general (Calabretta et al. 2017; Sheffield et al. 2017)	Use systems thinking (Schad and Bansal 2018; Schad and Smith 2019), trust yourself (Agor 1984), engage with competing worldviews (Schad and Smith 2019); use virtuous cycles for creativity and opportunity (Smith and Lewis 2011), keep an open mind (Wang and Gloor 2018). Separate out decision possibilities but also look for synergies (Smith et al. 2016). Consider a playful approach (Beech et al. 2004), use humour and irony to surface deeper meanings (Vince and Broussine 1996; Jarzabkowski and Lê 2017); structure information to find patterns (Calabretta et al. 2017)

Table 1. Cont.

Feature	Intuition	Analysis	Bridging the Gap through Paradox
Representation	Images, metaphors and narratives (Wang and Gloor 2018; Epstein 1994; Keller and Sadler-Smith 2019), non-verbal (Epstein 2010), archetypes (Jung 1921)	Abstract symbols, words and numbers, verbal (Epstein 1994, 2010; Keller and Sadler-Smith 2019; Sinclair and Ashkanasy 2005)	Practice thinking in images rather than words, create some space for visualising future scenarios, create some space for practising intuitive thinking. Visualisation can be powerful as a link between the rational and intuitive modes (Calabretta et al. 2017)
Evaluation of risk	Affective, fuzzy representations, high tolerance of and comfort with risk (Wally and Baum 1994), high confidence in intuitions (Dörfler and Ackermann 2012), Shirley and Langan-Fox (1996), Sinclair and Ashkanasy (2005), knowing with certainty, perceived as genuine (Akinci 2014), be willing to take a risk by following your intuition (Slovic et al. 2007) (Reyna 2004)	The rational approach is designed to reduce risk and uncertainty (Reyna 2004), not suited to ill structured problems with inherent ambiguity (Sinclair et al. 2009)	Acknowledge ambiguity in current conditions, practise being more comfortable with uncertainty. Bring the tension into the open and explore and experience it, stay with the paradox in order to bring about dramatic shifts (Lewis 2000). Value the paradox of analysis and intuition as being an important ingredient of high performance. Proactively raise tensions (Lewis et al. 2014). Accept both sides of the paradox and recognise their interdependence (Jarzabkowski et al. 2013). Relinquish control (Korthagen 2005)
Resistance to change	More resistant to change; can change with repetitive or intense experience Epstein (1991, 1994) and Sadler-Smith (2016)	Less resistant to change; changes rapidly and easily with new evidence and strong arguments (Epstein 1991, 1994; Sadler-Smith 2016)	Take advantage of both sides, and appreciate the distinctive benefits of both types of decision-making in the value of balancing them
Stress level	Suited to high stress conditions (Yu 2016)	Negatively affected by stress (Yu 2016)	Develop a more peaceful demeanour through stress reduction activities such as meditation, walking, being in nature. Avoid anxiety and defensiveness (Lewis et al. 2014). Cultivate emotional equanimity (Calabretta et al. 2017)
Relationship to complexity	Suitable when there is a high level of uncertainty, facts are limited, there is no clear path, several plausible alternatives exist (Agor 1986; Epstein 1991; Epstein et al. 1996) intrinsic certainty is helpful in complexity (Dörfler and Bas 2020)	Suited to situations with less uncertainty, with less information, analytical data to suggest a way forward, not suitable for use alone in complex environments (Agor 1989; Barnard 1968)	Understand the usefulness of intuition for high stress, ambiguous, volatile conditions; increase your acceptance of ambiguity and nonjudgement; accept you cannot control everything (Keller and Sadler-Smith 2019). Practice emotional equanimity, avoid anxiety and defensiveness (Calabretta et al. 2017)

Table 1. Cont.

Feature	Intuition	Analysis	Bridging the Gap through Paradox
Speed/time availability	Rapid (Evans 2008), almost immediate, oriented towards immediate action (Agor 1986; Akinci 2014; Khatri and Alvin 2000; Epstein 1994; Sadler-Smith 2016)	Slow (Evans 2008), oriented towards delayed action, needs time (Frankish 2010; Khatri and Alvin 2000; Burke and Miller 1999; Dane and Pratt 2007)	Use expert intuition when time is short; split the two approaches either by space or time (Van de Ven and Poole 1988, 1995)
Subjective versus objective	Subjective phenomena: based on accumulated personal experiences and feelings about the situation; self-evidently valid (Dane and Pratt 2007; Hogarth 2001), affectively charged (Dane and Pratt 2007) experienced passively through our emotions (Epstein 1991), often may be revealed by emotions (Epstein 2010; Hayashi 2001; Akinci 2014), experience is believing (Epstein 2010)	Objective phenomena; requires justification via logic, experienced actively: we are in control of our thoughts (Epstein 1991, 1994), emotionally neutral (Kahneman 2011)	Be comfortable with inner and outer processes and experiences; practice openness to unknown areas (Agor 1986); consider the pros and cons of each option and then assess your feelings about them. See paradox as a growth opportunity; switch cognitive gears (Calabretta et al. 2017). Intertwine the two approaches to reach a transcendence point (Dameron and Torset 2014). Confront the paradox and surface the tension to emerge a more accommodating understanding (Lewis and Dehler 2000)

3. Methodology

3.1. Data Collection

A qualitative approach was chosen for this research. Given that the study concerned the relationship between intuition and analysis in senior leaders, quantitative approaches are less suitable. Intuition is nebulous in nature, and it was a goal of the study to tap into respondents' individual experiences. Qualitative techniques enable the unearthing of an individual's lived experience (Marshall and Rossman 2014). The study aimed to understand respondents' lived experience in their own words, and semi-structured interviews were chosen to elicit those experiences. The main purpose of using this qualitative approach was to examine how the combination of intuition and analysis approaches works effectively. Through interviews, insights into participants' decision-making and problem-solving processes were captured to develop a model to provide a holistic picture to experts and practitioners.

3.1.1. Demographics of the Sample

The study collected data from 34 business leaders occupying positions of authority at the senior management level. We invited 45 people to participate in this interview process and 34 accepted. These well-experienced people are influential within society, and all have a wide variety of social networks. Potential participants were contacted through an email letter of invitation.

The sample contained 15 males and 19 females between the ages of 35 and 80, with between 10 and 50 years of leadership experience. Of the males, two were between 35 and 44 years, three between 45 and 54 years, one between 55 and 64 years, and the rest over 65. Regarding the females, two were between 35 and 44, six were between 45 and 54, four were between 55 and 64, and seven were over 65 years. These respondents were selected because they operate in fast-changing environments in which the pressure for problem-solving is intense and the stakes are often high. There may be either too much or too little information. Participants represented a wide variety of industries and careers ranging from a world-renowned commercial artist through large-scale investors and property developers, consultants, import-exporters, quality management, senior finance advisors, a multinational training provider, construction executives, television, retail, senior academics, liquidation manager, company directors and two hospital managers.

3.1.2. Ethical Considerations

The research followed the requirements of the University of Adelaide's human research ethics committee. Written consent forms were obtained. The ethics consent number is H-2020-119.

3.1.3. Interview Schedule

A series of open-ended questions were developed, and these were supplemented by probing questions. The interviews lasted between approximately 30 min and questions covered the following topics: a difficult investment decision recently made, any experience of discomfort between the options in making this decision, whether the participant used intuition or analysis or some combination of both, how the decision turned out, what is intuition, and a final question asking for any further thoughts. Interviews were conducted by Zoom or telephone.

3.1.4. Data reduction and Analysis

Written notes were taken of the interviews and responses to each of the questions were coded and themes analysed. All personal information was de-identified at source. NVivo software was used to code the main points from the interviews. Data collection was considered saturated when additional data had no impact on the understandings developed. Saturation has been variously defined in the literature and in this study, the dataset of

34 interviews provided a full understanding of the two concepts and the relationship between them in this context.

4. Research Findings

This section presents the results of 34 interviews conducted with senior business leaders operating in complex environments in which the pressure for problem-solving is intense and the stakes are often high. While each of the interviews was necessarily unique, they all produced very valuable insights and several major themes emerged. Interviewees appeared to really enjoy the interview, and three respondents contacted the researcher later to share additional insights which they had thought of after the interview was completed. Table 2 summarises the key findings and insights regarding the combination of intuition and analysis in practice.

Table 2. Interview findings and insights.

List	Content Investigated	Findings Highlighted
1	Difficulties of making an important decision	Answers to this question concerned business decisions for the most part, but there were also some personal decisions that respondents preferred to speak about. Thus there were discussions of shifting a business, undertaking a large-scale development, major building projects, tailored advice to investment clients, selling the family business, hiring and sacking people, big investments into the share market, taking on new businesses, as well as significant personal decisions such as leaving a marriage. Some people spoke of one decision, but others preferred to speak generically of difficult kinds of decisions or several similar decisions that they had made during their career.
2	Regarding the experience of discomfort between options when people make a decision	Many people were able to recall discomfort between the options. Various types of conflict caused discomfort, some of it is society based and some of it highly personal. A businesswoman talked in general about the conflict between gut reaction and what society tells us to do: “Stereotyping is very influential and powerful, and some people succumb to that pressure. But intuition is an innate feeling, it’s the truth of who we are”. An exporter/restaurant chain owner said in referring to her decision to sell a restaurant or not, that there was a roughly 60/40 breakdown in intuition versus rationality, and she struggled for some time with her decision. She said: “I just didn’t really feel as I wanted to continue with the restaurant. However, I knew rationally that restaurants will come back in the future. The forecast is quite good. But I just couldn’t convince myself to sell it because that would be taking the easy way out.” An exporter/retailer described the decision to sell his family business and reported that his intuitive feeling told him to stay with the business, just give it another six months and it will turn around, but eventually there came a crunch. He said: “I had a moment of clarity; I was going nowhere. I can still remember the conversation with the accountant. There was an enormous sense of relief when I suddenly decided to sell. Intuition dragged it out, but the rational decision was the right one. Intuition is like flying a plane without looking at the instruments”. An investor commented: “I make my decisions on analysis, but I do have some discomfort in terms of my feelings. I know the markets are not totally rational and so therefore you can’t be sure of getting the optimal outcome if you base your decision totally on analysis, but that’s what I do anyway.” The MD of an investment company reported that while her analysis told her not to take on an exciting but hugely challenging new project, her intuition told her to go for it. “My deep intuition said you can do it. I have resented the project at times and struggle with going on. But then at the same time I know it’s the right thing.” A farmer/exporter reported intense discomfort over her decision about whether to challenge her father’s will. She said: “I was nervous about the implications of challenging the will. It would make me seem like I was money grabbing and people wouldn’t understand. But it wasn’t about that. There was cognitive dissonance between what dad said and the will itself as presented to us. My decision was driven by a sense of mismatch. But of course, I had difficulty in substantiating my decision to challenge the will.” A nurse manager reported a strong feeling of tension when her intuitive judgement was overridden by another expert’s analysis.

Table 2. Cont.

List	Content Investigated	Findings Highlighted
3	The use of intuition or analysis or some combination of both	Analysis alone: Respondents who used only analysis were quick to comment about the shortcomings and dangers of intuition. Three males and two females, all aged over 65, said they use only analysis. They range from investors through to a professor and a consultant. The professor said: “Regarding intuition, I don’t trust it. I’m suspicious of it. The bigger and riskier the decision, the more I would be suspicious of it.” An investor said: “Intuition? I don’t use it. You can’t see it. You can’t trust it. It’s nothing better than an educated guess. I would never use intuition. You can’t act on it. What you need to do is to track a problem back to its source.” An investor / developer stated: “In my view intuition could be costly”.
		Intuition alone: The three respondents who relied upon intuition (one male, two females) were highly convinced of its efficacy above analysis and spoke with enthusiasm. The artist said: “I never would have done it [shifted his entire business to another state] if I had gone through an analysis process.” The TV presenter asserted: “I make decisions very intuitively. I get thoughts that pop into my head with no rational basis behind them. Most of the time when those thoughts come, it’s out of the blue. And I know I should act on them. All the logic isn’t necessarily there yet, but I just know it’s the right thing for me to do.” The MD respondent spoke of bypassing analysis and the scaffolding of the rational brain in order to climb into her subconscious at a deeper level.
		Combination: intuition and then analysis: Of the 20 people who started out with intuition, they were inclined to check their thinking with rationality later, often because the existing analysis needed to be tempered to the unique circumstances, or perhaps just to be sure if many people would be affected. According to an investor: “I think if you are making an intuitive judgement you are blending it with rational judgement. They are a bit intertwined, like spaghetti.” One investment advisor commented: “I rely on my decision-making history and experience, and then in terms of analysis I rely upon the company’s research.” A quality manager said: “I choose the right thing to do. Data is one thing but the story itself brings it all together and the story is much more than data. I think intuition builds early opinion and is based on experience. Analysis is using other evidence afterwards.” A construction executive said: “I can look at a forecast and I just know it’s not right. This happens to me quite a bit. I can walk into an office and I can tell you exactly what the climate is like in that office. After my first intuition if I need to, I go and get the evidence to support or challenge that.” An investment advisor said: “I definitely use intuition, but I also use insurance through diversification and risk management. I’m using something which is non-scientific and I’m aware of that. There are no rational grounds, but we can’t always do analysis.”
4	How did the decision turn out?	Combination: analysis and then intuition: Five people said they use analysis followed by intuition. A consultant noted: “If there is no data, you have to use intuition. In fact, change is driven by intuition.” One investment advisor reported: “I rely upon the company’s research to do the analysis and then I know the framework that I’m dealing with. I overlay analysis with my own intuition and that’s my usual technique”. One research centre director said: “It’s more difficult to rely on intuition if the consequences are large; for example, you are responding to the board where you then have to justify your decisions and you can’t just say: I think it’s the right thing to do.” One investor said: “I do both; which one first? I think I do analysis first, but it depends on how big the decision is. I believe I work pretty much on analysis. Although regarding people, there may be an intuitive bit. The whole point of education is to learn to suspend judgement, to avoid stereotyping people and a lot of this comes from your upbringing”.
		No respondent reported dissatisfaction with their decision. One person said: “It was the only decision which could be made”. Some people agreed that decisions should firstly come from analysis to ensure the right information before moving on to intuition, tempering the data with an overlay of intuition. Some respondents noted that it depended on the situation and with more complex problems, whether large or small, then intuition will be successful, perhaps validated by analysis for checking.

Table 2. Cont.

List	Content Investigated	Findings Highlighted
5	What is intuition to you?	<p>Gut feeling/experience/body sensation: A total of 22 people related intuition to experience. This was also often expressed as gut feel or gut feeling, based on knowledge and experience gained over many years. Respondents talked about recognising patterns. For example, a consultant engineer said; “I think intuition is gut feel. It is purely based on my experience. Will it work? Other people don’t have that kind of experience. They need to do the calculations, get the data, et cetera. Most of my decisions are made on gut feel.” One investor was keen to distance herself from gut feel altogether: she said “What is gut feel? In terms of gut feel it to me it sounds more like emotion. I try to take emotion out of my decision-making”. One senior bank officer said: “In terms of gut feelings this is basically your experience and your education. This is not about emotion. Perhaps with quick decisions I might use emotion, but on the whole regarding emotion I was trying to have no emotion, I was completely unemotional”. The senior project manager said “Gut feeling is pattern recognition and it’s critical for me. It goes back to; if you only have a little piece of the information, then experience is helpful even if the situation is fairly novel. In fact, there is nothing new under the sun.” One farmer investor said: “I think gut feel is experience. Intuition is a lot about experience and also is common sense. Another senior project management said: “Gut feeling is significantly experience based. What I do is to ask the minimum number of questions and based on that I get the guts of the information which could be relevant. I’m filtering out a lot of information.” One hospital manager said: “I can walk into a person’s room and I can know if they are seriously ill, even if the chart says they are fine. I would notice little things about them; for instance, they look anxious in the eyes, et cetera. This is gut feeling. I guess I am using environmental cues. Other people can get so focused on the analysis that they miss the vital stuff which is right in front of their eyes. I call this ‘my little miracle’, that I could tell straight away. The older and more experienced I get, the more and more notice I take of my intuition”.</p> <p>Some respondents were able to give a location for their gut feel. An investor said: “To me intuition is gut feel, it’s based on past experience. Gut feel is a physical reaction that things aren’t quite right. It’s probably in different places for different people. I have a sensitive gut so I feel it in my gut.” A franchise manager said: “Intuition is gut feeling. It’s like happy vibe/confirmation/ the icing on the cake. I feel it in my throat area, almost like I need to swallow. That’s if it’s a happy feeling. If it’s a bad feeling then I certainly feel it in my stomach”. The insolvency director related gut feel as a body sensation: “I’m very observant about conflict. I can see an unhappy situation very quickly and it is through a body signs. I’ve got a sense of discomfort; I can quickly detect the signs and decide to move away. I feel the hair standing up on the back of my neck, my heart starting to race, et cetera. I know it’s time to go”.</p> <p>Aha experience/Eureka moment/Lightbulb moment: Creative intuition was a familiar experience to many respondents. A total of 18 people mentioned an idea just coming to you, dropping in unexpectedly, often when you are not thinking about the problem, an aha experience or Eureka moment, suddenly hitting the nail on the head unexpectedly, often happening during the night or upon awakening in the morning, new solutions arriving seemingly out of nowhere. A TV presenter said: “I just get thoughts/ideas/solutions which bob into my head about future plans. They’re not connected to other thoughts at that time. I might be thinking about something else and novel thoughts just appear. Then, I ask the question: what does this mean? Why have I got these ideas? Thoughts pop into my head with no rational basis behind them. And I know I should act on them”. A senior project manager said; “Intuition is something that goes on inside your head and out of your control. Something pops up. You might just wake up and something happens. I tend to remove myself from the situation go and sit quietly with a cup of coffee and often the answer is clearly there. And you know it is right.” One farmer exporter said; “This happens to me at 3 AM in the morning. I may be thinking about something and my brain has clearly been mulling over it and suddenly I just get an idea and I think; that has hit the nail on the head! I need to get up now write it down. I do have this kind of thing quite a lot. And mostly at night. Or it could be when I’m focusing on something else and the thought just pops into my head.” The architecture professor indicated that in the middle of creating a design, suddenly in the middle of the night a connection arises, and a really good design is apparent and that this is an exciting and good feeling. A senior midwifery practitioner said that she often noticed that she would feel strongly that a decision was correct, and that analysis would kick in some time later and then she would understand more about why she had made a particular decision.</p>
6	Further thoughts	<p>The following comments were made at the end of interviews. Some comments were about getting the right information, balance and risk. “If you are intuitive, surround yourself with people who are good at analysis.” “This is a very important question for business-people. Balance is important. It’s important also to get the right information; It’s very hard to balance intuition and analysis and this depends on who you are.” “If I think the risk is very high, then I am more likely to fall back on analysis. With a lower risk I might use more intuition; in terms of cognitive dissonance, you could choose analysis first and then use intuition or you could do it the other way around.” “Intuition is a special form of intelligence, but you need to look for the signals.” “Intuition is like a conversation with the subconscious, and insights just pop up, without you asking for them.” Other comments concerned the positive relationship with emotion, the creation of the right mindset for intuition to arrive, that intuition is deeper and more valuable, and that it may be necessary to justify an intuitive decision post hoc.</p>

5. Discussion

5.1. A Strong Connection between Research Findings and Literature

This group of 34 senior business leaders were articulate, experienced and confident. They were happy to talk about their decision-making and problem-solving methods and were easily able to describe how they use them. Most people said they use a mixture of intuition and analysis and of that group, intuition followed by analysis for checking was the most frequent process, in line with the work of [Akinci and Sadler-Smith \(2009\)](#) and [Okoli and Watt \(2018\)](#). There was not much talk about reiterating between analysis and intuition after the first round, perhaps because these respondents were highly experienced problem-solvers. Descriptions tended to be sequential not synergistic. However, there were some indications of tension between analysis and intuition and the actions they suggest, in keeping with the conception of paradoxical thinking.

Descriptions of intuition were often based around gut feeling arising out of experience and pattern recognition, supporting intuitive expertise findings widely reported in literature; for example, [Agor \(1984\)](#) and [Dane and Pratt \(2007\)](#). Experience enables people to be aware of underlying patterns that can be applied to a variety of problem contexts and quickly turned into actions. This kind of intuition has been called incremental ([Dane 2010](#)) and involves connecting information in a new but somewhat predictable fashion building on existing domain knowledge ([Sinclair 2010](#)). Respondents indicated that gut feel enabled them to decide quickly and confidently, and this differentiated them from less experienced decision-makers.

Radical or creative intuiting which produces completely new, unexpected, and creative outcomes was also mentioned by respondents who reported an experience of a thought arising from nowhere, perhaps at night or in a comfortable environment. This also supports literature findings of intuition as being able to connect patterns in a novel manner, similar to creativity ([Stierand and Dörfler 2016](#); [Sinclair and Ashkanasy 2005](#); [Cappon 1994](#)). Respondents described being unable to explain how the thought arose, it just popped up, and that experience felt enjoyable, often accompanied by a sense of warmth. No one who used intuition was troubled at all about admitting that fact. Some people went straight to intuition, based upon their high levels of experience and finely tuned judgement.

People who mostly use intuition also spoke about the need to justify their decision-making using an analytical filter to explain it to followers, in a process of post hoc rationalisation ([Wagner 2002](#)). This is in keeping with traditional views in psychology of analysis as being the superior method ([Khatri and Alvin 2000](#); [O'Connor 2014](#)). Only six people were suspicious of intuition and said they did not use it at all, referring to it as nothing but an educated guess that you cannot trust. One person said that using her intuition had led her to make mistakes in the past, and she therefore did not trust it.

An interesting and common finding was that intuition enabled a much deeper understanding of the problem situation. Five respondents indicated that analysis could be superficial, although useful in clear-cut situations. This is in line with philosophical understandings of analysis as being socially constructed and an organising principle that is not objective, as discussed in Section 2.2. When a situation is complex, using one's intuition often based upon experience or perhaps with a solution arising as a complete package out of nowhere or one's subconscious would give a more sensitive/sophisticated outcome. Some suggested that you needed to be in the right frame of mind for the clarifying insight to occur. Access to the subconscious was viewed as helpful and worth cultivating. Some respondents set up the conditions for insight to occur, either through doing something different, seeking out relaxation, or expectantly waiting for insight. This is in keeping with the second, third and fourth level of awareness of intuition proposed by [Sinclair \(2011\)](#). In this process, intuition arrives not by whim but through focusing on a different activity, perhaps supplemented by an intent for intuition to arrive, through to cultivating an actively conscious clear intention by entering a relaxed mental state. One respondent spoke about working hard to bypass the scaffolding of the analytic system to achieve the wealth of information available in the subconscious.

Other conceptions of intuition were around doing the right thing, actions consonant with one's values, a part of being human, that we are all connected. Put alongside beliefs that facts and logic are limited, even though our society is biased towards that approach, it is useful to explore how a person might move themselves in the direction of greater acceptance of intuition and greater access to the subconscious. Explorations of processes available to access deeper levels of intuition in an intentional way have been canvassed in many different domains, as is discussed below.

5.1.1. Intuition as a Deeper Way of Understanding

Within philosophy, intuition is regarded as the only way to directly understand ultimate reality. The research findings herein provide some support for intuition as a deeper method of knowing than analysis. Developmental psychologists have written about life-cycle development, often culminating with a refined state of consciousness that is described as transcendent. [Kohlberg \(1973\)](#) posited a seventh state of consciousness at which point people's moral behaviour emerges from their interconnectedness with the universe; now, decisions will be creative and all-inclusive. Maslow proposed an advanced level of development in which people are fully human, more intuitive, more global, and more holistic. At this level, their decisions will be wiser and more all-encompassing. Self-transcendence is the ability to reach a unified consciousness and an ability to see the world and one's purpose in it in a holistic fashion ([Maslow 1968](#)). This communion with the universe beyond the boundaries of the self enables people to put their own needs aside in favour of service to other people and to some higher force or greater good. The person will have a richer understanding of the meaning of their life and a deeper sense of purpose. Now the self is enlarged to include aspects of the whole and the distinction between the self and the other can be transcended. [Wilber \(2001\)](#) continued the work of Maslow with his explanation of interconnectedness in which the person is conscious of a bond with a deeper more fundamental reality, reflecting the oneness of all things. A focus on the exterior world or objective observation is now extended to the implicate order of the natural law. Being in touch with a greater whole enables people to overcome their own ego and humbly appreciate their role in the larger picture. We can now see the essence of an issue. Such a process is self-reinforcing ([Korthagen 2005](#)).

Such views are also present within Vedic science which proposes that individuals have limitless potential, and that human consciousness has as its source the field of pure consciousness where people can use their full capacities in their daily life. Contemporary writers have related the Vedic approach to developmental psychology ([Alexander et al. 1990](#)). The unified field can be accessed through deepening one's level of consciousness to a transcendental or universal consciousness, beyond feeling or ego and accessed when awareness shifts to functioning at a more profound level. At the level of universality, the mind can settle, and the boundaries of the self can disappear. When the level of transcendental consciousness is experienced, there is a wholeness or unity to life. The unified field contains infinite creativity and perfect orderliness, and decisions can be made from a holistic perspective, beyond individual concerns ([Dillbeck and Dillbeck 1987](#)).

A similar approach appears within studies of wisdom science recounting knowledge about how to live a good life. The characteristics of the wise person have been discussed in teachings from Confucianism, Taoism and Buddhism. Plato and Aristotle wrote about the need to recognise the limits of our own knowledge and develop a deep understanding of the context and causes behind events ([Oakes et al. 2018](#)). [Grossmann et al. \(2020\)](#) presented a common wisdom model which expresses the importance of moral grounding and perspectival metacognitive abilities, including being able to take different perspectives, balance different interests, appreciate the broader context of any particular problem, and possess the humility to know our own limitations. The constellation of psychological characteristics of wisdom that emerged from a Wisdom Task Force of experts reported in the above study includes deep insight and self-transcendence. [Sternberg \(2020\)](#) expanded this model with the inclusion of the need to take a long-term view, consider interests not just

viewpoints, and develop a comprehensive view of the common good. It has been suggested that we will need greater wisdom as we navigate growing complexity and uncertainty going forward (Glück et al. 2019).

The importance of intuition in being able to appreciate issues in a holistic way is present in both Eastern and Western writings. Jung (1926) was a proponent of depth psychology, which is concerned with the inner and unconscious world of people, and the benefit of bringing this into consciousness. Jung believed that the unconscious mind contains not only repressed material from consciousness, but also a “collective unconscious” which is the inheritance of universal archetypes present regardless of culture or time and representing the basic themes of life. The process of emerging intuitions from the collective unconscious, or bringing the subconscious into conscious awareness, is viewed as a critical aspect of psychic growth in Jungian psychology. Jung can be viewed as a bridge between psychology and philosophy, as well as between Eastern and Western thought (O'Connor 2014).

Another interesting juxtaposition of approaches deriving from Eastern and Western traditions is a study by Farb (2020) that considered the cultivation of wisdom in the two traditions of clinical psychology and contemplative practices. The paper integrates these two traditions within modern wisdom theory and investigates how wisdom can be developed. Farb concludes that insight is a central construct in the gaining of wisdom. Through insight we can see new information about a problem from a different angle. This is a central part of psychotherapy in which a person is encouraged to develop metacognitive awareness of their usual way of thinking and to distinguish this from fact, leading to wisdom. The use of mindfulness techniques for this purpose has become more widespread in psychotherapy in recent times. When considering contemplative research, the issue of ego development arises. Within psychotherapy, strengthening of the ego is viewed as progress. Within contemplative understandings, ego construction is maladaptive, a delusion, something which limits our ability to think beyond our immediate concerns and needs to be transcended to arrive at wisdom. Decentring and a recognition of our own unimportance are necessary to truly reach a point of wisdom. The stable self is an illusion, experience is impermanent, and there is deep interdependence between our own experience and the entire world. Perspectival metacognition therefore is a hallmark of wise reasoning.

While psychotherapy may encourage ego strengthening, self-transcendent experiences have been reported across cultures (Haidt 2006), ranging from mindfulness through to mystical or peak experiences in which the person feels that the self is transcended, and boundaries have faded away. Such experiences are quite widespread and seem to be strong sources of well-being and of creative intelligence (Yaden et al. 2016). Common themes are decreased salience of the self and increased feelings of connectedness (Yaden et al. 2017), as well as an enhanced form of creative intelligence. When people can achieve this level of understanding, they are free from judgement and stereotyping and can make harmonious and wise decisions from a position of strength and holistic appreciation. Holistic intuition allows integration of information from various sources (Pretz et al. 2014). Kitson et al. (2020) in their review of self-transcendence research observed that this concept can be viewed as a state, a trait, a value or a developmental process. Given this diversity, these authors propose a multi-method approach to investigating self-transcendence including self-report, observation, interviews, neurological and physiological measures, and journaling. The concept of self-transcendence is common to many religions and philosophies including those of Nietzsche, Zen Buddhism and Jordan Peterson (Maboloc 2018). Meditation is one method recommended to calm the rational mind so that intuitions can arise (Jagtiani 2019). Respondents in the present study reported walking, going to a relaxing space, instituting a quiet time as ways of getting in touch with their creative intuition.

The capacity to embrace holistic thinking through intuition is closely intertwined with systems thinking. Nagahi et al. (2021) clearly showed a relationship between systems thinking ability and high levels of intuitive preferences within engineering managers and

systems engineers dealing with complexity and complex problems. Taking a systems worldview is the ability to think holistically, see the big picture, consider short and long-term consequences of decisions, view multiple perspectives of an issue, see the connections between components of the whole, and be comfortable with paradox and ambiguity (Linder and Frakes 2011). The parallel with holistic thinking arising from transcendence is clear, but what is less clear is how to achieve systems thinking capability.

5.1.2. A model of Decision-Making/Problem-Solving and Its Applications

Surveys of literature present a varied panorama about the meanings and usefulness of intuition and analysis. The interviews with respondents have confirmed and expanded literature findings and are now elaborated to produce a model (Figure 1). The iceberg model presented below emerged from integration of literature findings, the research problems arising therefrom, and the interview results. An early form of the model was shared with subject matter experts from systems thinking, management and psychology to gain their views and slight modifications were then included in the final model. The model is illustrated with examples to help senior leaders to come to better comprehend the steps involved.



Figure 1. The Iceberg model of decision-making and problem-solving.

This model indicates increasingly fine levels of awareness through perception, analysis, experience, insight, and finally holism. The two top levels are visible: the bottom three levels are below the surface. Decisions can be undertaken at the level of the senses or through analysis using whatever scaffolding is chosen. Drawing upon one's personal experience enables the addition of gut feeling responses to our repertoire, while fostering the conditions in which insights emerge from the unconscious provides a yet deeper level of understanding. At the lowest level of the iceberg, a holistic big picture is able to emerge in which one can perceive both the constituent items and the whole, zoom in and also zoom out; this is the deepest level of appreciation and enables a full understanding of something as an integral part of natural law and of oneself within the totality of the problem scenario. Wise leaders will be able to use each of these understandings with awareness of their value, travelling up and down through the levels as appropriate. Each level incorporates the levels above it in a way reminiscent of Boulding's hierarchy of complexity (Jackson 2009).

When a decision is simple, such as a quality check by someone on an assembly line, limited perception using the senses is all that is required. As problems become more

complicated, existing expert knowledge can be accessed and decisions made in an analytic rational fashion, such as by an accountant calculating taxation implications. Via perception we can appreciate sensory knowledge of concrete objects such as colours and smells. If our knowledge is attained through thought, we can understand relationships. When we use analysis, we can develop abstract knowledge. In the current findings, respondents spoke about researching the correct information from the correct sources. Using rational thinking is perfectly suitable in many conditions. Perceiving and analysis are not challenging, but do not take much account of the uniqueness of any given situation, and do not require a holistic, systemic view. The focus is directly upon the problem.

As situations become more complex, an experienced person such as a discipline leader or divisional head will have seen many situations before or at least something similar to them and will be able to quickly draw upon their experience, accessing internal body cues and external sensory cues to produce an approach which they are confident will work. In this study respondents referred to their ability to think on their feet and use gut feeling to make quick and beneficial decisions. When facing complex situations, plumbing into one's experience will bring many advantages. Senior leaders have amassed a wealth of experience that should provide a rich pool of patterns to assess in coming to a feasible action in relation to the problem of interest.

As the scope of problem-solving becomes more complex and more broad reaching, such as a senior leader within a large company who must make strategic decisions for the future, the top three layers of decision-making capability will need to be augmented by deeper understandings that can be accessed through novel connections. This leader can set the scene for insights and deeper understandings. This may require stepping back from the situation, an attitude of calm, making space for insight to appear. Our current world is very busy, and the external environment contains much noise and distraction. Creative intuition is a direct process of knowing that is more refined than perception, analysis, and expert intuition, and can give insights into the working of the natural world that can transcend and unify our previous knowledge. Creative intuition can be viewed as a powerful source of original and fruitful ideas in all areas of human activity (Dillbeck and Dillbeck 1987). Respondents in this study spoke about waking up during the night with a sudden resolution appearing or going to a quiet place with the intention of encouraging a synthesising solution to drop into consciousness. This kind of intuition forms the basis for wisdom. Leaders at the top of organisations should note the importance of creating the conditions to enable creatively connecting the dots and forming new associations, with the goal of broader novel solutions that take account of the surrounding context.

At the deepest level of the iceberg, the wise leader such as a head of government or of a global organisation needs a more inclusive awareness to perceive the problem space as a whole and in all its detail. This is the most fundamental level of understanding, such as required by national and international leaders who must make momentous decisions in which there are many elements and considerations and great uncertainty. A deep form of creative intelligence must be encouraged and cultivated, perhaps through the use of "passionate intention" (Bradley 2011), or "indwelling" (Dörfler and Stierand 2018), in which the person immerses themselves, the veil is removed, and they can now directly experience the essence of the situation. Applying systems thinking and viewing the big picture as a whole, as well as appreciating its component parts, will provide a nuanced appreciation lending itself to thoughtful and all-encompassing actions. This advanced level of problem-solving may require personal development and wisdom; and will produce a robust system thinking perspective. Perspectival metacognition and a solid moral sense form the foundation for wise problem-solving with a holistic view. At this level, intuitive foresight will enable the perception of opportunities into the future. Global leaders can train themselves to access intuition consciously and actively through creating a space where the busy thoughts and concerns of senior leadership do not intrude, and intuiting is summoned with intention and confidence. It has often been noted that intuition can be accompanied by positive affect and a sense of relief (for example, Dane and Pratt (2007): similarly, the

use of a systems thinking approach can reduce the unease which accompanies complexity and conjure up a feeling of psychological comfort when we are able to move away from a self-focused view to a more all-encompassing understanding.

6. Conclusions

“In the case of intuition, it is a question of seeing through things, getting down to what is implicit, uncovering the layer that lies beneath the surface, the things that cannot be expressed directly, in linear language.” (Korthagen 2005, p. 7). This paper is concerned with the use of intuition and analysis by leaders who must solve problems in volatile and uncertain environments. Various ways of understanding these two primary modes are surveyed and compared, and ways in which intuition and analysis can work together considered. Ways of combining the two approaches are not always clear. The paper has examined the potential of intuition and analysis through interviews with senior leaders operating in complex settings. The results support literature from psychology and philosophy indicating that both intuition and analysis have their strengths and weaknesses. Up until recently, much leadership thinking has been focused on the external world of rational decision-making. This paper explores a more comprehensive approach to decision-making and problem-solving which includes acceptance and cultivation of internally based awareness accessed through intuition and holism. The contribution of the paper is a model which shows the transition from exterior to interior cognition in which holistic thinking can produce a clearer vision of the problem space and a more comprehensive appreciation of the various factors involved. As Sinclair (2020) noted, while there is research expanding our theoretical understanding of intuition, there is a need for practical training tools. Our model lays out the steps to achieve holistic systemic thinking at a personal level.

Business problems are often viewed as existing in the external world and therefore need rational solutions. At a deeper level, however, consideration of the complex factors driving external problems reveals that many problems we face are motivated internally, and their solution also requires the use of tacit knowledge and an acknowledgement of the interior realm of intuition. We need all-encompassing visions of a deep nature of the problems we now face. This research links together two separate bodies of theory and research into the use of intuition, which is generally conducted within the realms of psychology and organisational behaviour with philosophical appreciation of its value. The paper highlights the benefit of developing a holistic approach and draws comparisons between analytical methods as practised in the West and various approaches to intuition arising from different cultural backgrounds as a potentially superior way of making complex decisions and solving complex problems. Future research will explore in greater detail the usefulness of holism in leadership problem-solving within organisations. The authors plan to evaluate the iceberg model through interviews with senior leaders to elicit their understandings of the model and their assessment of its applicability within their own organisational setting. The contribution of this paper lies in its broad ranging approach to leadership decision-making and problem-solving, drawing upon a wide range of belief systems and theories, and the development of a template that will assist leaders to understand how they should adjust their mindset given the type and extent of the problem which must be addressed.

Author Contributions: L.H. contributed to the development of the decision-making framework and analysis; T.N. contributed to conceptual model development; L.H. and T.N. contributed to research paper outline, writing and editing. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the University of Adelaide (protocol code H-2020-119, 13/07/2020).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

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