In Pursuit of a Better Understanding of and Measure for Entrepreneurial Mindset

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Abstract

The Allan Gray Orbis Foundation (AGOF) aims to activate personal initiative, intellectual imagination, achievement excellence, courageous commitment and a spirit of significance in individuals who aspire to be responsible high-impact entrepreneurs. AGOF believes that this will be achieved through the development of an entrepreneurial mindset in these individuals along with a tactical focus on education and experience complemented by the personal traits of effort and ethics.

With a focus on the development of an entrepreneurial mindset, the Foundation joins many leading edge entrepreneurial programmes that are beginning to focus less on the gaining of content knowledge about entrepreneurship, and more on developing an entrepreneurial mindset (Krueger, 2015). However, Krueger (2015) states that merely saying that a program is developing an entrepreneurial mindset is insufficient if we cannot be rigorous about what that term means both theoretically and empirically.

In response to the need for rigor, this literature review seeks to develop a more rigorous theoretical and empirical understanding of entrepreneurial mindset and its measurement.

From the literature review, multiple definitions for entrepreneurial mindset and mindset in general are put forward, and from these the following common understanding of entrepreneurial mindset is proposed:

Entrepreneurial mindset relates to how a person thinks, their state of mind or the lens through which they see the world, and how this influences their propensity to pursue entrepreneurial activities and outcomes.

This state of mind or lens is influenced by multiple factors that include what people know or do not know (related to their knowledge), what people have done or have not done (related to their experience), what people can do or believe they can do (related to their level of competency and self-belief), and who they are (related to their personality, values, attitudes and beliefs).

The literature review goes on to look at current measurement tools for entrepreneurial mindset as well as their limitations in providing a comprehensive measure for the mindset dimensions that were explored. Following these limitations, the development of a quantitative survey based on the identified entrepreneurial mindset dimensions is proposed. This survey is intended to measure entrepreneurial mindset nationally as a general population baseline that can then support and inform the development and impact of entrepreneurial education and activities. The survey can also support and inform the design and development of new government policies, and entrepreneur support organization programs and initiatives. Before the survey can be replicated in other countries to reveal further insights into both the effectiveness of current interventions as well as the development of policy and program recommendations, its validity and reliability will need to be confirmed.

Additional recommendations for future research are then proposed, both to AGOF and to the broader research and practitioner communities.

1 www.allangrayorbis.org
Introduction

In 2016, Allan Gray Orbis Foundation and the Global Entrepreneurship Research Network (GERN)\(^1\) began collaborating on a project that aims to achieve the following outcomes related to entrepreneurial mindset:\(^1\):

A. The development of a shared understanding of entrepreneurial mindset.

B. The development of a universal methodology to measure entrepreneurial mindset.

C. The development of an evidence-base that can be used to enhance entrepreneurial mindset education theory and practice.

This paper aims to take the first steps toward achieving these outcomes by providing a literature review on entrepreneurial mindset, its definition, origins and measurement and then proposing a way forward to begin to achieve these outcomes.

To do this, this paper consists of three main parts:

- Part 1 – In Pursuit of a Better Understanding of Entrepreneurial Mindset
- Part 2 – In Pursuit of a Better Measure for Entrepreneurial Mindset
- Part 3 – Possible Future Research Areas Relating to Entrepreneurial Mindset and Measurement

Part 1 explores the genesis of entrepreneurial mindset and how an understanding of the mindset of entrepreneurs was initially rooted in the behavioural sciences and is based on decades of research within the fields of personality, cognitive and social psychology. Thereafter, a chronological overview of research relating to the mindset of entrepreneurs is presented along with the multiple definitions that have been proposed. A shared understanding of entrepreneurial mindset is then proposed along with a summary of general themes that emerge from the literature. Finally, a list of entrepreneurial mindset dimensions supported by the literature review is tabulated.

Part 2 explores the measurement of entrepreneurial mindset by reviewing literature associated with the measurement of these constructs as well as reviewing the research methodologies used in identifying the entrepreneurial mindset dimensions reviewed in Part 1 of this paper. Lastly, based on the limitations of each of these tools in measuring the entrepreneurial mindset dimensions identified in Part 1, a recommendation for the development of a revised tool is put forward.

Part 3 recommends possible research areas for the AGOF, GERN, and other stakeholders to consider in taking this study further.

In the spirit of lifelong learning, it is anticipated that this paper and the insights and recommendations proposed will continue to be refined as a community of practice emerges within this field and research on entrepreneurial mindset advances.

\(^1\) http://gern.co/
\(^3\) http://gern.co/gern/entrepreneurial-mindset-study
An often cited definition of entrepreneurial mindset is a specific state of mind which orients human conduct towards entrepreneurial activities and outcomes (Fayolle, 2012, Putta, 2014). To understand entrepreneurial mindset more deeply and its relevance to entrepreneurship and entrepreneurship education, its roots in academic literature from the behavioural sciences will be reviewed. Through this, a multidisciplinary understanding of entrepreneurial mindset and the potential for future research and practice can be explored.

The Genesis of Mindset

Entrepreneurial mindset finds its early roots in personality psychology, which attempts to describe, predict and explain recurrent behaviours that set people apart from one another (Corr and Matthews, 2009, p. 43). Gordon Allport (1897-1967) is often referred to as the founder of personality as a separate field of psychology building on the seminal work in psychology and the emergence of personality psychology led by James (1842-1910), Freud (1856-1939), Calkins (1863-1930), Adler (1870-1937) and Jung (1875-1961). Allport made a significant contribution to this particular field of study with his Concepts of Trait and Personality (1927) study. Allport defined personality as a dynamic organisation, within an individual, of psychophysical systems that determine one’s unique adjustments to the environment (Allport, 1937, p. 48). McAdams and Pals (2006, p. 212) offer a modern approach to this definition defining personality as an individual’s unique variation on the general design of human nature, expressed as a developing pattern of dispositional traits, characteristic adaptations and integrative life-stories complexly and differentially situated in culture.

Cloninger (in Corr and Matthews, 2009) synthesised the various definitions of personality psychology stating that a person’s personality begins with certain innate biological dispositions (both distinct and shared, hereditary and influenced) and through life these innate tendencies are channelled and influenced by multiple, interrelated factors that include experiences and culture and result in a pattern of behaviour, cognitions and emotional patterns that all constitute what is referred to as personality.

Mcdougall (1932) was one of the first to propose various similar traits or topics to better understand personality. He proposed five factors, namely, intellect, character, temperament, disposition and temper – with each of these factors being very complex and having many underlying variables. However, his methodology for defining these factors needed further refinement; his work sparked a half a century of further study to better organise the language of personality into a more coherent structure.

Allport (1937) argued that internal individual traits were the real causes of personality and needed to be more deeply understood. The challenge, he said, was how to use language to define and express traits that are not concrete and are generally experienced internally. Allport, also known as the ‘trait’ psychologist, developed a list of 4500 trait-like words to help understand personality. He then clustered these words into three trait levels to help us understand the level of influence they may have on behaviour. These levels consisted of cardinal traits, central traits and secondary traits. He proposed that cardinal traits dominate and shape a person’s behaviour and are the ruling behaviour traits. Central traits, which are not as overwhelming as cardinal traits but can be found to some degree in every person, are the basic building blocks of behaviour, an example being honesty.
Secondary traits, according to Allport, are like central traits but only occur under specific circumstances and need to be understood in order to provide a complete picture of human complexity.

Allport went on to hypothesise an idea that is very closely related to our current understanding of mindset. He proposed that internal and external forces, which he called genotypes and phenotypes (1937, p. 16), have an influence on an individual’s behaviour. Genotypes are the internal forces that influence behaviour; they include how information is processed and retained, and how these forces influence one’s interaction with the external world. Phenotypes are external forces that influence one’s behaviour and how one accepts their surroundings. The largest criticism at the time of this hypothesis was that these were internal theories and were difficult to be observed, measured or proven. Along with theories relating to motivation, drive and our frame of reference or perspective, Allport added significant seminal work for other theorists to build upon.

The 4500 traits, of which many may be considered internal theories, were too many to begin to provide insight into personality and human behaviour. A more structured and more scientific approach was needed to identify the relationships between these traits. It was during this period that a statistical analysis methodology called factor analysis became more widely used in the field of psychology. Factor analysis, originally developed by Spearman (1904), and then later generalised by Thurstone (1947), is a statistical test used to find relationships between multiple items and identify a number of ‘factors’ that then serve as clusters to help one understand core behaviour trends or themes.

An early example of how factor analysis added value to the behavioural sciences is when Fiske (1949) used the method to develop a rating scale, adapted from a larger scale developed by Cattell (1947), which resulted in the identification of 22 core personality attributes (Table 1).

Table 1: Fiske’s Personality Rating Scale Definitions

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1. Readiness to Cooperate vs. Obstructiveness</td>
</tr>
<tr>
<td></td>
<td>2. Predictable vs. Unpredictable</td>
</tr>
<tr>
<td></td>
<td>3. Assertive vs. Submissive</td>
</tr>
<tr>
<td></td>
<td>4. Depressed vs. Cheerful</td>
</tr>
<tr>
<td></td>
<td>5. Frivolous vs. Serious</td>
</tr>
<tr>
<td></td>
<td>6. Attentive to People vs. Cool, Aloof</td>
</tr>
<tr>
<td></td>
<td>7. Easily Upset vs. Unshakable Poise</td>
</tr>
<tr>
<td></td>
<td>8. Narrow Interests vs. Broad Interests</td>
</tr>
<tr>
<td></td>
<td>9. Suspicious vs. Trustful</td>
</tr>
<tr>
<td></td>
<td>10. Good-natured, Easy-going vs. Self-centred, Selfish</td>
</tr>
<tr>
<td></td>
<td>11. Silent, introspective vs. Talkative</td>
</tr>
<tr>
<td></td>
<td>12. Cautious vs. Adventurous</td>
</tr>
<tr>
<td></td>
<td>13. Good-natured, Easy-going vs. Self-centred, Selfish</td>
</tr>
<tr>
<td></td>
<td>14. Socially Poised vs. Clumsy, Awkward in Social Situations</td>
</tr>
<tr>
<td></td>
<td>15. Rigid vs. Adaptable</td>
</tr>
<tr>
<td></td>
<td>16. Dependent vs. Self-sufficient</td>
</tr>
<tr>
<td></td>
<td>17. Placid vs. Worrying, Anxious</td>
</tr>
<tr>
<td></td>
<td>18. Conscientious vs. Not Conscientious</td>
</tr>
<tr>
<td></td>
<td>19. Marked vs. Slight Overt interest in opposite sex</td>
</tr>
<tr>
<td></td>
<td>20. Frank, Expressive vs. Secretive, Reserved</td>
</tr>
<tr>
<td></td>
<td>21. Dependent vs. Independent Minded</td>
</tr>
<tr>
<td></td>
<td>22. Limited vs. Marked Overt Emotional Expression</td>
</tr>
</tbody>
</table>
Through factor analysis, the Fiske’s survey revealed five factors, each having a high correlation with some of the 22 items in Table 1. These are summarised in the points below.

1. **Socially Adaptable** (Cheerful, Talkative, Adventurous, Adaptable and Placid)
2. **Emotional Control** (Unshakable, Self-sufficient, Placid, Emotional Expression, Social Poise, Easily Upset, Worrying, Anxious, Dependent)
3. **Conformity** (Readiness to cooperate, Serious, Trustful, Good-natured and easy-going, and conscientiousness)
4. **The Inquiring Intellect** (Broad Interests, Independent-Minded, Imaginative, Seriousness of Purpose and Conscientiousness)
5. **Confident Self-expression** (Assertive, Talkative, Marked Interest in the Opposite Sex, Frank, Expressive)

Fiske’s development of these five factors led to significant further study focused on defining a more universally accepted five factor model of personality. Cattell (1957), Tupes and Christal (1961), Norman (1963), Borgatt (1964), Eysenck (1970) and Guilford (1975) all contributed to the refinement of these factors.

Following a study on the relationship between age differences and personality, Costa and McCrae (1976) proposed the three broad traits of Neuroticism (N), Extraversion (E) and Openness to Experience (O), leading to the development of the Neuroticism-Extraversion-Openness Inventory (NEO-I). Later, Costa and McCrae (1985) recognised two additional factors: Agreeableness (A) and Conscientiousness (C) to develop the NEO Personality Inventory (NEO-PI). Abandoning the use of NEO as an acronym, this is now often referred to as the “Big Five” personality traits or Five Factor Model (FFM), and often remembered nowadays through the ‘OCEAN’ or ‘CANOE’ acronyms. Table 2 summarises the five factors of personality.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>Curious, original, intellectual, creative and openness to new ideas.</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>Organised, systematic, achievement oriented and dependable.</td>
</tr>
<tr>
<td>Extraversion</td>
<td>Outgoing, talkative, sociable.</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>Affable, tolerant, sensitive, trusting, kind and warm.</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>Anxious, irritable, temperamental, moody.</td>
</tr>
</tbody>
</table>

Table 2: Costa & McCrae’s NEO-PI / Big Five Personality Traits

Popular critiques of the Big Five include Block (2004) who raised concerns about the factor analyses statistical method as well as how the questionnaire measured the Big Five. Ashton and Lee (2007) found the Big Five to be a useful tool in summarising basic information relating to one’s personality but raised questioned the usefulness of the tool in understanding personality in its detail, depth or context. McAdams (1992) proposed a ‘Big Six’ by introducing a sixth trait domain: Honesty-Humility. Broadly speaking, however, consensus around the Big Five model of personality has grown steadily since the early 1990s.

The Big Five has since been used as a knowledge base to better understand many sub-disciplines including attitudes, goals and motivation; everyday behaviour; physical health; psychopathology; relationships and social status; self-concept; subjective well-being; work and achievement, mindset, and later entrepreneurial mindset.

Based on further research within many of these sub-disciplines, as well as developments within cognitive and social psychology, the concept of mindset began to develop, both in its definition and underlying theory as well as in its properties as a construct.
Framing Mindset as a Theory

Bruner and Tagiuri (1954) introduced the term ‘naïve, implicit personality theory’ to describe how people make assumptions of others based on how they interpret their attributes and traits and the relationships between these. This shift in focus from personality traits to the interpretation of these traits, and the impact of these interpretations sparked initial thinking that is now well aligned to the definition of mindset. In 1955, Gage and Cronbach attempted to view implicit personality theory as a set of assumptions that a person makes, often unconsciously, between the personality traits of people, with these assumptions influencing how we respond to the people around us (Gage and Cronbach, 1955, p. 420). These implicit personality theories generally revolved around one’s assumptions of others, which expanded mindset research into the social psychology domain, leading to overlaps with popular theories related to what is more commonly known as stereotyping, the halo effect, fundamental attributional error, and other attributional biases.

The term schema refers to a knowledge structure that people use to make sense of both social and organisational situations. Similar to implicit personality theory, examples of schemas also include stereotypes (Hamilton, 1979), prototypes (Cantor and Mischel, 1979, 1977), implicit theories (Brief and Downey, 1983, Schneider, 1973), causal schemata (Kelly, 1973) and frames (Minsky, 1975). Most of these schemas are cognitive frameworks that help us to better understand behaviour. A specific schema that is concerned with both understanding the behaviour of self and others and with guiding one’s behaviour in specific situations became known as a script (Schank & Abelson, 1977, Graesser, Gordon & Sawyer, 1979, Abelson, 1981, Gioia & Poole, 1984).

Scripts can originate through habituating behaviour, where a learned sequence of behaviour can result in future behaviour being evoked by similar situational cues. Scripts were more widely researched in organisational psychology in understanding consumer behaviour and the role of advertising and social influence.

Various research studies conducted by Dweck, Reppucci and Diener (1973 - 1980) identified two major cognitive effects on behaviour. These were referred to as the ‘helpless’ response and the ‘mastery-oriented’ response. The helpless response generally avoids challenges and when faced with obstacles performance deteriorates rapidly. In contrast, the mastery-orientation drives people to look for challenging tasks and when faced with obstacles and even failure there is evidence of a maintained striving to overcome these obstacles. Dweck and Elliot (1983, 1988) went on to look at how people’s motivation in goal-setting influenced behaviour. They proposed two motivations behind goal-setting, goals that are motivated by the level of performance, where individuals are concerned with gaining favourable judgments and avoiding failure, and goals that are motivated by the opportunity to increase one’s level of competence. This sparked further research into the role of implicit theories, cognition and the underlying reasons for these initial findings relating to mastery-orientation and goal-setting. Bandura and Dweck (1985, 1986) went on to find relationships between effort, goal-setting and mastery-orientation. This research led to the introduction of what Dweck and Leggett (1988) called implicit theories of intelligence, which is divided into entity theory and incremental theory. Entity theory, on the one hand, sees intelligence as a fixed or uncontrollable trait; incremental theory, on the other hand, sees intelligence as a malleable, increasable and controllable quality.
This led to deeper research to determine whether these implicit theories relate to people, places and things and not only personal goals.

Dweck, Chiu and Yong (1995) then expanded the scope of these implicit theories of intelligence and proposed that people’s implicit theories about human attributes influence the way they understand and respond to their world. In 2006, Dweck called this implicit theory mindset.

According to Molden and Dweck (2006), mindset refers to the view you adopt of both yourself and others and has a profound impact on your life and the decisions you make. Dweck (2006) described mindset as a kind of personal paradigm. The much quoted Oxford Dictionary defines mindset as an ‘habitual way of thinking’. McGonical (2015) simplifies these definitions and simply refers to mindset as a belief that biases how you think, feel and act and that reflect your philosophy of life. Reed and Stoltz (2011) describe mindset by comparing it to a skillset. They propose that if your skillset is what you can do, then your mindset is what you see, think and believe. They go on to offer a simple definition of mindset; the internal lens through which you navigate life, with this lens influencing everything that you see and do. They suggest that each person’s unique mindset or lens, is coloured by personal life experiences, personal traits and education.

Rucker and Galinsky (2016) went on to expand upon the definition of mindset as a ‘frame of mind that affects the selection, encoding and retrieval of information as well as the types of evaluations and responses individuals give.’ (2016, p. 161)

Fixed and Growth Mindsets

Following Dweck and Legget’s research in 1988 and additional research by Dweck et al. (1995), two broad types of implicit theories or mindsets were proposed; entity theory and incremental theory, which since 2006 have been more commonly referred to as fixed and growth mindsets.

Dweck (2006) defined a fixed mindset as one where you believe that your qualities are carved in stone and are unlikely to change. She goes on to define a growth mindset as one where you believe that through effort everyone can change and grow.

Dweck went on to describe the likely influence that these mindsets may have on how you respond to the world around you. These included how you respond (consciously or unconsciously) to challenges, obstacles, effort, criticism and the success of others.

However, Rucker and Galinsky (2016) proposed that the research that has contributed to understanding fixed and growth mindsets should act as a springboard to further exploration of mindsets, beyond these two mindsets alone. These include the exploration of mindsets related to power (Galinsky et al., 2016; Anderson and Galinsky, 2006), construal level (Trope and Liberman, 2010), regulatory focus (Higgins, 1997), self-monitoring (Snyder and DeBono, 1985) and the implemental-deliberative mindset (Gollwitzer et al., 1990), to mention a few.

For the purpose of this paper relating to entrepreneurial mindset, the seminal work in personality psychology, the understanding of the effect of cognition on behaviour and mindset has acted as a springboard to better understand entrepreneurial mindset, which will now be focused on in more detail.
Exploring Entrepreneurial Mindset

Entrepreneurial mindset is of critical importance when promoting entrepreneurship as entrepreneurial mindset and the related entrepreneurial skills play a key role in enabling people to notice and leverage entrepreneurial opportunities (Nichter and Goldmark, 2009 in Valerio et al., 2014). Ireland (2003) promoted entrepreneurial mindset as a critical characteristic for leaders to create sustained value for the future through the way in which entrepreneurial mindset can drive one’s ability to rapidly sense, act, and mobilise, even under uncertain conditions. What follows is a chronological review of notable contributions toward the understanding of what we are now beginning to understand as entrepreneurial mindset.

Solomon and Winslow (1988) carried out a literature review on understanding the characteristics of entrepreneurs. They summarised their findings in Table 3.

Table 3: Summary of Early Characteristics of Entrepreneurs (Solomon and Winslow, 1988)

<table>
<thead>
<tr>
<th>Date</th>
<th>Authors</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1848</td>
<td>Mill</td>
<td>Risk bearing</td>
</tr>
<tr>
<td>1917</td>
<td>Weber</td>
<td>Source of formal authority</td>
</tr>
<tr>
<td>1934</td>
<td>Schumpeter</td>
<td>Innovation, initiative</td>
</tr>
<tr>
<td>1954</td>
<td>Sutton</td>
<td>Desire for responsibility</td>
</tr>
<tr>
<td>1959</td>
<td>Hartman</td>
<td>Source of formal authority</td>
</tr>
<tr>
<td>1961</td>
<td>McClelland</td>
<td>Risk-taking, need for achievement</td>
</tr>
<tr>
<td>1963</td>
<td>Davids</td>
<td>Ambition, drive for independence, responsibility, self-confidence</td>
</tr>
<tr>
<td>1964</td>
<td>Pickle</td>
<td>Mental drive, human relations, compatibility and technical knowledge</td>
</tr>
<tr>
<td>1971</td>
<td>Palmer</td>
<td>Risk measurement</td>
</tr>
<tr>
<td>1973</td>
<td>Winter</td>
<td>Need for power</td>
</tr>
<tr>
<td>1974</td>
<td>Borland</td>
<td>Internal locus of control</td>
</tr>
<tr>
<td>1974</td>
<td>Liles</td>
<td>Need for achievement</td>
</tr>
<tr>
<td>1977</td>
<td>Gasse</td>
<td>Personal value orientation</td>
</tr>
<tr>
<td>1978</td>
<td>Timmons</td>
<td>Drive/self-confidence, goal orientation, creativity and innovation</td>
</tr>
<tr>
<td>1980</td>
<td>Sexton</td>
<td>Energetic, ambitious, positive reaction to setbacks</td>
</tr>
<tr>
<td>1981</td>
<td>Welsh &amp; White</td>
<td>Need for control, responsibility seeker, challenge taker, moderate risk taker</td>
</tr>
<tr>
<td>1982</td>
<td>Dunkelberg &amp; Cooper</td>
<td>Growth oriented, independence oriented, craftsman oriented</td>
</tr>
<tr>
<td>1986</td>
<td>Femald &amp; Solomon</td>
<td>Values of entrepreneurs</td>
</tr>
<tr>
<td>1987</td>
<td>Winslow &amp; Solomon</td>
<td>Mildly sociopathic</td>
</tr>
</tbody>
</table>

Solomon and Winslow then carried out multiple interviews with entrepreneurs and found that entrepreneurs have a high level of confidence and optimism. Contrary to some previous research, they found that entrepreneurs are not reckless risk-takers and are not prone to taking great risks and prefer to be very calculated in their risk-taking. They are independent and self-reliant and have an internal locus of control in that they are not easily swayed by the judgments of others.

Developments from Personality Psychology

Other earlier research, specifically focused on the factors that influence the decision to start a new business focused on trait or personality characteristics of individuals (Brockhaus, 1980, 1982; McClelland 1961). Van de Ven et al. (1984) and Gartner (1985) also developed models of the entrepreneurial process and included behavioural and situational factors in their models.
Earlier models focusing on entrepreneurial intention (Shapero, 1975, Shapero & Sokol, 1982, Bird, 1988, Boyd and Vozikis, 1994) included a focus on attitudes and their underlying drivers in explaining the entrepreneurial process. These models generally included perceptions on the desirability of becoming an entrepreneur, the feasibility of starting one’s own business, and past experiences of starting a business and whether these experiences were positive or negative.

Borland (1974) and Begley and Boyd (1986) proposed how characteristics such as an internal locus of control, a tolerance for ambiguity and a Type A personality can be found in people with a higher propensity for entrepreneurship. Cunningham and Lischeron (1991) proposed certain entrepreneurial behaviours relating the dominant entrepreneurship school of thought or entrepreneurial models of the time.

These behaviours included intuition, vigour, energy, persistence, self-esteem, personal values, need for achievement, risk taking, innovation, creativity, discovery and alertness to opportunities. Most of these behaviours were found outside of the traditional management school entrepreneurship models.

Cunningham and Lischeron referred to what they called The Psychological Characteristics School of Entrepreneurship where one’s needs, drives, attitudes, beliefs, and values determine behaviour. This focus on personality factors led to three personality characteristics receiving considerable attention in research. These are personal values such as honesty, duty, responsibility and ethical behaviour; risk taking propensity; and, the need for achievement.

Lau et al. (2012) after reviewing more recent literature relating to the characteristics of entrepreneurs summarised their findings, see Table 4 below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Authors</th>
<th>Entrepreneurial Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>Burgelman</td>
<td>Innovativeness, negotiating, integration, results orientation</td>
</tr>
<tr>
<td>1985</td>
<td>Pinchot</td>
<td>Moderate risk-taking, non-system bound orientation, informality, results orientation</td>
</tr>
<tr>
<td>1989</td>
<td>Mitton</td>
<td>Innovativeness, networking, integration, opportunism, change-orientation, flexibility in control, results orientation</td>
</tr>
<tr>
<td>1989</td>
<td>Covin &amp; Slevin</td>
<td>Innovativeness, proactiveness and risk-taking</td>
</tr>
<tr>
<td>1993</td>
<td>Gelsler</td>
<td>Innovativeness, non-system bound orientation, change orientation, flexibility in control</td>
</tr>
<tr>
<td>1996</td>
<td>Zahra</td>
<td>Innovativeness, venturing, strategic renewal</td>
</tr>
<tr>
<td>1997</td>
<td>Dess et al.</td>
<td>Intentionality, autonomy</td>
</tr>
<tr>
<td>1997</td>
<td>Knight</td>
<td>Innovativeness, proactiveness</td>
</tr>
<tr>
<td>1997</td>
<td>Dess et al.</td>
<td>Intentionality, autonomy</td>
</tr>
<tr>
<td>2000</td>
<td>Barret et al.</td>
<td>Innovativeness, proactiveness, risk-taking</td>
</tr>
<tr>
<td>2000</td>
<td>Zahra &amp; Garvis</td>
<td>Innovativeness, venturing, proactiveness</td>
</tr>
<tr>
<td>2001</td>
<td>Lumpkin &amp; Dess</td>
<td>Proactiveness, competitive aggressiveness</td>
</tr>
<tr>
<td>2002</td>
<td>Goosen et al.</td>
<td>Innovativeness, proactiveness, influence</td>
</tr>
<tr>
<td>2003</td>
<td>Antonic &amp; Hisrich</td>
<td>New venture formation, product/service/process innovation</td>
</tr>
<tr>
<td>2004</td>
<td>Kanter</td>
<td>Networking, integration, result orientation</td>
</tr>
<tr>
<td>2005</td>
<td>Kuratko et al.</td>
<td>Integration, opportunism</td>
</tr>
<tr>
<td>2007</td>
<td>Zampetakis &amp; Moustakis</td>
<td>Integration, change orientation, informality</td>
</tr>
<tr>
<td>2008</td>
<td>Yiu &amp; Lau</td>
<td>Product/organizational innovation, domestic/international venturing</td>
</tr>
<tr>
<td>2008</td>
<td>Man et al.</td>
<td>Innovativeness, networking, integration, opportunism, results orientation</td>
</tr>
<tr>
<td>2009</td>
<td>Heavey et al.</td>
<td>Innovativeness, venturing, renewal</td>
</tr>
<tr>
<td>2009</td>
<td>Ireland et al.</td>
<td>Entrepreneurial strategic vision, pro-entrepreneur organizational architecture</td>
</tr>
<tr>
<td>2010</td>
<td>Mitchelmore &amp; Rowley</td>
<td>Innovativeness, integration, opportunism, results orientation</td>
</tr>
<tr>
<td>2011</td>
<td>Welter &amp; Smallbone</td>
<td>Risk-taking, networking, non-system bound orientation, change orientation, flexibility in control, informality</td>
</tr>
</tbody>
</table>
From these 23 studies, the entrepreneurial attributes of innovativeness (14 counts), integration (7 counts), proactiveness (6 counts) and results orientation (5 counts) show up dominantly. Integration, according to Lau et al. (2012) refers to being involved in all aspects of the business and being a strong systems thinker who can make sense of complexity.

In 2000, McGrath and MacMillan released a book entitled *The Entrepreneurial Mindset: Strategies for Continually Creating Opportunity in the Age of Uncertainty*. They propose that a distinguishing characteristic of an entrepreneurial mindset is the view that uncertainty is one’s ally and not one’s enemy. They then propose several ways to better manage uncertainty and develop the mindset that indeed considers uncertainty as one’s ally. Notable points include their view that ‘everyone plays’ (McGrath and MacMillan, 2001), this notion encourages ideation without judgement and places importance on serious implementation, but open and non-judgmental creativity and innovation. They go on to propose that people should experiment intelligently, which is related to multiple aspects including calculated risk-taking and an openness to learning being more dominant than a fear of failure.

Cromie (2000) suggested seven core entrepreneurial attributes relating predominantly to personality. These include a need for achievement, an internal locus of control, calculated risk-taking, tolerance of ambiguity, creativity, a need for autonomy, and self-confidence. In conjunction to the above attributes, Cromie also conducted the General Enterprising Tendency Test, developed by Durham University Business School, which also seeks to measure one’s level of motivation.

Also in 2000, Midgley et al. developed a set of scales which they referred to as the *patterns of adaptive learning scales (PALS)*. These scales, initially used in the education sector, looked at identifying attributes of personal achievement, goal-orientation, efficacy, self-handicapping strategies (which are driven by a fear of failure and an external locus of control), avoidance of the unknown or novel options, and self-presentation. Midgley et al. (2001) then looked further into goals approached by a performance motivation in comparison with goals approached by a mastery motivation, where they propose the benefit of mastery-approach goals, which is in line with Dweck and Leggett’s (1988) theory related to goal motivation and mindset.

Several recent studies have looked into the Big Five personality traits in order to gain insights into entrepreneurial personality. Zhao and Seibert (2006) propose that personality adds value in better understanding entrepreneurial behaviour, but must always be considered as one important component of a multi-dimensional model of variables, processes, and environmental factors affecting entrepreneurship. Hao et al. (2010) agree that personality constructs are important to developing an understanding of entrepreneurship, but that other variables must also be included.

Brandstätter (2011) and Leutner et al. (2014) agreed that the Big Five personality traits predict business intention, creation and success and that all of the traits correlated somewhat with entrepreneurial success. However, based on further meta-analytical studies, they found that narrow personality traits such as innovativeness predict outcomes better than broad traits such as conscientiousness and extraversion. A common view from correlation studies is the acceptance of the role that the Big Five play in ensuring entrepreneurial success, but not in isolation from other contributing factors.

**Developments from Cognitive Psychology**

Mitchell et al. (2002) challenged the focus on entrepreneurial personality attributes and drew on learnings from the cognitive sciences and not only personality psychology. They looked at the idea of entrepreneurial cognition, which they defined as the knowledge structures that people use to make assessments, judgments or decisions involving opportunity evaluation, venture creation and growth.

Later, Fayolle (2012) proposed a similar definition of entrepreneurial mindset as a specific state of mind which orientates human conduct towards entrepreneurial activities and outcomes.
This led to a significant shift in research with the incorporation of the cognitive psychology subset of the behavioural sciences into what was already understood through research related to personality attributes. The Fayolle paper encouraged further theoretical study in this field in conjunction with the cognitive sciences.

Furthering a cognitive perspective on entrepreneurship, Baron (2004) suggested how a cognitive perspective may add insights into key aspects of the entrepreneurial process,

which at this point incorporated some insights related to entrepreneurial attributes drawn from personality psychology. Baron’s work investigated the answers to three specific questions. Why do some people choose to become entrepreneurs and others not? Why do some people, and not others, recognize opportunities for new products and services that can lead to a profitable outcome? Why are some entrepreneurs so much more successful than others? Baron’s findings in relation to these questions are summarised in Table 5 below.

<table>
<thead>
<tr>
<th>Why do some persons and not others become entrepreneurs?</th>
<th>Why do some persons and not others recognize opportunities?</th>
<th>Why are some entrepreneurs more successful than others?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced perceptions of risk (Persons who become entrepreneurs perceive risks as smaller than other persons do)</td>
<td>Basic perceptual processes (Persons who recognize opportunities are more proficient than others at object or pattern recognition)</td>
<td>Counterfactual thinking (Successful entrepreneurs are better than less successful ones at using counterfactual thinking to formulate improved task strategies)</td>
</tr>
<tr>
<td>Prospect theory (e.g., Persons who become entrepreneurs overweight small probabilities)</td>
<td>Signal detection theory (e.g., Persons who recognize opportunities are more proficient at distinguishing “hits” from “false alarms”)</td>
<td>Processing styles (Systematic vs. heuristic) (Successful entrepreneurs are better at switching between these two processing styles)</td>
</tr>
<tr>
<td>Greater susceptibility to various cognitive biases (e.g., Optimistic bias, affect infusion, planning fallacy, and illusion of control)</td>
<td>Regulatory focus theory (e.g., Persons adept at recognizing viable opportunities show a mixed pattern of promotion and prevention focus)</td>
<td>Reduced susceptibility to certain cognitive biases (e.g., Successful entrepreneurs are more successful at avoiding biases such as sunk costs)</td>
</tr>
<tr>
<td></td>
<td>Entrepreneurial alertness schema (Persons who recognize opportunities have a more developed alertness schema)</td>
<td></td>
</tr>
</tbody>
</table>

Baron concluded by stating that a cognitive perspective can prove extremely valuable to the field of entrepreneurship and proposed how a wide range of cognitive factors may prove helpful for future research.

Brockner et al. (2004), with a focus on gaining insights from the cognitive sciences, investigated the role of regulatory processes on the entrepreneurial process.

They concluded that regulatory focus theory provided a well-developed framework to better understand motives, beliefs and behaviours that in turn can influence the success of entrepreneurial ventures. Future research was proposed as past empirical tests were not yet conducted with entrepreneurs.

The Role of Effectuation in the Development of Entrepreneurial Mindset

Sarasvathy (2001) made a significant contribution by proposing how effectuation rather than causality drives entrepreneurial contingency and economic growth. Causation processes take a particular effect as given and focus on selecting between the means to create that effect. Effectuation processes, however, take a set of means as given and focus on selecting between the possible effects that can be created with that set of means (Sarasvathy, 2001, p. 245).
Whether an individual looks at a set of resources through an effectuation or causality lens is completely up to the individual and may not be a conscious decision, but the probability of an innovative outcome is much higher through an effectuation lens.

Effectuation aligns with a preference of affordable loss rather than expected returns, which in turns allows for the creation of more options and a longer-term view of maximising returns. Effectuation also prioritises strategic alliances over competition as these lead to a greater ability in dealing with uncertainty and lower barriers to entry. Another effectuation preference relates to one’s exploitation of contingencies rather than a default exploitation of pre-existing knowledge. This preference allows for more adaptability and pivoting whereas a preference for responding based on past knowledge does not allow for experimentation with new or less explored opportunities. Lastly, effectuation seeks to control an unpredictable future rather than predicting an uncertain future. The core difference between these two preferences relate to what one has the power to influence and control and what one does not.

Read et al. (2009) went on to show how effectuation influences one’s view of the future, attitudes toward others, underlying logic, and predisposition toward risk and contingencies. These have a higher likelihood of influencing new venture creation more positively than responses that are more closely related to causation. This is further supported by Chandler et al. (2011) who proposed subsets of effectuation, namely experimentation, affordable loss, and flexibility. They demonstrated how causation is negatively associated with uncertainty, while experimentation is positively correlated with uncertainty. By developing validated scales to measure causation and effectuation they contributed significantly to the field.

The Role of GRIT in the Development of Entrepreneurial Mindset

In 2007, Duckworth et al. defined grit as the perseverance and passion for long-term goals. This closely aligns to the importance of sustained effort, highlighted by Dweck (2006). For their initial study, they developed a measurement scale, called the Grit Scale, to investigate correlations with other constructs. Their findings included a negative correlation with IQ, but a positive correlation between Grit and the Big Five personality traits. This offers interesting insights, since we have shown earlier how the Big Five, generally have a positive correlation with entrepreneurial activity.

Duckworth and Quinn (2009) later validated the Grit Scale and developed a shorter version called the Short Grit Scale. In 2016, Duckworth published a book entitled Grit: The Power and Passion of Perseverance, which promises to spark further interest in the relationship between this construct and entrepreneurial mindset and other disciplines.

Mooradian et al. (2016) looked at a combination of grit and innovativeness as drivers for entrepreneurial success. They found that consistency of interest, perseverance of efforts, and ongoing innovation had a positive relationship with entrepreneurial performance, and that grit had a positive relationship with innovativeness which opens additional areas for future study.

More Recent Contributions to the Understanding of Entrepreneurial Mindset

Lumpkin et al. (2009) showed how autonomy and autonomous decision making and action improves entrepreneurial outcomes. McGee et al. (2009) reflect on how Entrepreneurial Self Efficacy (ESE) is being included in many studies and is generally included in intentionality models.

Mitchell and Shepherd (2010) looked at several variables related to images of self and developed the subsets of the images of opportunity, vulnerability (fears) and capability (potential).
McKelvie et al. (2011) focused on better understanding the effect of uncertainty, and how one deals with ambiguity, on entrepreneurial activity and realised that different responses to uncertainty significantly impacts the success of their venture.

Following an extensive analysis of entrepreneurial education and training programs globally, Robb and Valerio et al. (2014) split entrepreneurial mindset into three clusters: 1). socio-emotional skills, communication and teamwork (which focuses on characteristics relating to leadership); 2). entrepreneurial awareness; and, 3). perceptions of entrepreneurship. Socio-emotional skills include persistence, self-efficacy, need for achievement, proactivity, creativity, optimism, locus of control, openness to ambiguity, opportunity recognition and self-confidence. Entrepreneurial awareness focuses on entrepreneurial values, attitudes and norms, and perceptions of entrepreneurship focus on one’s willingness and intention to become an entrepreneur.

Pizarro (2014) focused more on the development of an institutional and pedagogical model for developing entrepreneurial mindset and further validated the use of the General Enterprising Tendency Test, developed by Durham University Business School (as used by Cromie, 2000). The findings once again highlight creativity, need for autonomy, risk-taking, internal locus of control and a need for achievement as key measures of entrepreneurial mindset.

Putta (2014) added that entrepreneurial mindset includes characteristics such as motivation, determination, passion, flexibility, opportunity recognition and exploitation, planning ahead, putting in consistent effort, dealing with uncertainty, and what he called the insane hunger to succeed.

In 2015, Stauffer studied what he referred to as an innovator’s mindset, and developed a measurement instrument that focuses particularly on the processes for innovating and the underlying mindset, called the innovation cycle. Stauffer included creativity, adaptability, resourcefulness, imagination, curiosity, courage, and integrity as key attributes of this mindset.

Pfeifer et al. (2016) looked at the relationships between entrepreneurial identity, entrepreneurial self-efficacy, personal business exposure and social norms as key shapers of the entrepreneurial mindset.

After the release of a White Paper in 2015 and the launch of an online survey called the Entrepreneurial Mindset Profile (EMP), Davis et al. (2016) placed specific emphasis on the reliability and validity of their measure for entrepreneurial mindset. Davis et al. developed 14 traits related to entrepreneurial mindset, categorised into two groups, personality traits and what they referred to as skills (areas that are generally considered to be more malleable). This distinction helped to separate aspects more related to entrepreneurial personality (what had now become referred to as entrepreneurial mindset, but had slightly differing attributes). These dimensions are summarised in Table 6.
Table 6: EMP Dimensions (Davis et al. 2016)

<table>
<thead>
<tr>
<th>Traits</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independence</td>
<td>Future Focus</td>
</tr>
<tr>
<td>The desire to work with a high degree of independence</td>
<td>The ability to think beyond the immediate situation and plan for the future</td>
</tr>
<tr>
<td>Preference for a Limited Structure</td>
<td>Idea Generation</td>
</tr>
<tr>
<td>A preference for tasks and situations with little formal structure</td>
<td>The ability to generate multiple and novel ideas and to find multiple approaches for achieving goals</td>
</tr>
<tr>
<td>Nonconformity</td>
<td>Execution</td>
</tr>
<tr>
<td>A preference for acting in unique ways; an interest in being perceived as unique</td>
<td>The ability to turn ideas into actionable plans; the ability to implement ideas well</td>
</tr>
<tr>
<td>Risk Acceptance</td>
<td>Self-confidence</td>
</tr>
<tr>
<td>A willingness to pursue an idea or a desired goal even when the probability of succeeding is low</td>
<td>A general belief in one’s ability to leverage skills and talents to achieve important goals</td>
</tr>
<tr>
<td>Action Orientation</td>
<td>Optimism</td>
</tr>
<tr>
<td>A tendency to show initiative, make decisions quickly, and feel impatient for results</td>
<td>The ability to maintain a generally positive attitude about various aspects of one’s life and the world</td>
</tr>
<tr>
<td>Passion</td>
<td>Persistence</td>
</tr>
<tr>
<td>A tendency to experience one’s work as exciting and enjoyable rather than tedious and draining</td>
<td>The ability to bounce back quickly from disappointment and to remain persistent in the face of setbacks</td>
</tr>
<tr>
<td>Need to Achieve</td>
<td>Interpersonal Sensitivity</td>
</tr>
<tr>
<td>The desire to achieve at a high level</td>
<td>A high level of sensitivity to and concern for the well-being of those with whom one works</td>
</tr>
</tbody>
</table>

Developing a Shared Definition of Entrepreneurial Mindset

From the literature reviewed, there are many nuanced definitions of entrepreneurial mindset, with each adding its own unique take on the concept.

McGrath and MacMillan (2000) viewed entrepreneurial mindset as a way of thinking about business that focuses on and captures the benefits of uncertainty. Mitchell et al. (2002) understood entrepreneurial mindset as knowledge structures or schemas, similar to that of mindset, that people use to make assessments, judgments or decisions involving opportunity evaluation for venture creation or growth. Ireland (2003) defined entrepreneurial mindset as a growth-oriented perspective through which individuals promote flexibility, creativity, continuous innovation and renewal.

Other definitions refer to the socio-emotional skills and overall awareness of entrepreneurship associated with entrepreneurial motivation and future success as an entrepreneur (Peterman and Kennedy, 2003; Fayolle et al., 2006; Souitaris et al., 2007).

Entrepreneurial mindset is also viewed as meta-cognitive in nature and refers to the ability to rapidly sense, act and mobilize even under uncertain conditions (Haynie et al., 2010). According to Valerio et al. (2014), entrepreneurial mindset refers to the socio-emotional skills and overall awareness of entrepreneurship associated with entrepreneurial motivation and future success as an entrepreneur.

Lastly and more succinctly, entrepreneurial mindset was referred to as a specific state of mind which orientates human conduct towards entrepreneurial activities and outcomes (Fayolle, 2012; Putta, 2014).

From the definitions above and those of mindset, a common understanding emerges where entrepreneurial mindset relates to how one’s thinking or state of mind (conscious or sub-conscious), or the lens through which they see the world (Reed and Stoltz 2011), influences their propensity to engage in entrepreneurial activities and outcomes.
This state of mind or lens is influenced by multiple factors, which include:

- what people know or do not know (relating to knowledge)
- what people have done or have not done (relating to experience)
- what people can do or belief they can do (relating to level of competency and self-belief)
- who they are (relating to personality, values, attitudes and beliefs).

All of these play a role in developing specific lenses through which we see the world that may be conducive to driving entrepreneurial activity and behaviour.

Emerging Characteristics of Entrepreneurial Mindset from Literature

Following the multiple dimensions found in the literature, relating to various definitions and understandings of entrepreneurial mindset, what are the key characteristics of an entrepreneurial mindset? What does an entrepreneurial mindset look like in comparison to a mindset with a lower probability of leading to entrepreneurial activities and outcomes?

From the literature reviewed, the following 11 key themes emerged as core characteristics of an entrepreneurial mindset.

1. Lifelong learning and openness to change

Based on the premise of a growth mindset, a characteristic of entrepreneurial mindset is both the belief in the malleability of behaviour (Dweck et al., 1995), that behaviour can change over time and is not generally fixed, and the openness to allow one’s own behaviour to change. This includes an openness to consistently learn from one’s context and environment, which can include learning from criticism and setbacks (Dweck, 2006), in order to increase the likelihood of entrepreneurial activities or outcomes.

Putta (2014) emphasises the importance of being flexible, to be able to modify and adapt depending on the context. Mooradian et al. (2016) add that firstly there needs to be a willingness or openness to change or compromise rather than a rigidity and fixation to following only a planned course. This openness can then lead to an ability to adjust readily and to pivot with changing circumstances, which is a driver of increased entrepreneurial outcomes (Totem Inc., 2015). Sarasvathy (2001) describes this as effectuation, the ability to exploit contingencies that arise unexpectedly over time, and can only be exploited when there is an initial belief and openness to change and ongoing learning.

The openness to ongoing learning influences how one will respond to critical feedback as well as failure. Stauffer (2015) sees entrepreneurial mindset as an open feedback system, where one is open and receptive to feedback because it is an opportunity for modification and improvement. Moberg et al. (2014) agrees with this notion and sees the acceptance of failure as a necessary process of learning that has the potential to open opportunities for innovation. This is further supported by Taulbert and Schoeniger (2010) who focused on challenging one’s fear of failure in order to increase entrepreneurial outcomes, where the fear of failure can be replaced by the desire to learn from experience and continuously improve.

2. Engagement in a complex and uncertain world

The world we live in is remarkably complex and is filled with uncertainty and areas out of our control or influence. Rather than perceiving the world as stable, predictable and controllable, entrepreneurial mindset, building upon a characteristic of growth mindset where one believes in and is open to a dynamism and complexity (Dweck et al., 1995), sees the world through this lens and seeks to understand it better...

With an entrepreneurial mindset the world and one’s context is seen through a non-linear, more dynamic and more ecological lens (Sarasvathy 2001) where one is actively seeking linkages, systems and patterns (Totem Inc., 2015) in order to better understand the complexity and make sense of it. Through this lens,
one learns to accept areas that are not in their influence or control and to focus on areas that are. In this context, Sarasvathy (2001) shows that one’s focus is on the controllable aspects of an unpredictable future, rather than trying to predict the future and control it as much as possible. This reveals an underlying internal locus of control and influence where one can continue to influence within uncertain and complex environments, irrespective of the circumstances. Entrepreneurial mindset allows for openness to accept uncertainty, rather than trying to control it, and developing an awareness of areas that are not within one’s influence and control (Putta, 2014).

3. Creative and innovative approaches to problem solving

A key characteristic of entrepreneurial mindset is the ability to transcend traditional rules, patterns and ideologies, and to create meaningful, fresh ideas and interpretations (Valerio et al., 2014). Such creativity has been known as a central characteristic of entrepreneurs and influences how problems are perceived, analysed and responded to. Creativity allows for flexibility and adaptability in problem solving where the responses to problems are fuelled by imaginative, innovative, curious and versatile interventions (Kirton, 1976; Solomon and Winslow, 1988; Pizarro, 2014).

Moberg et al. (2014) noted that creativity relies on imagination, that is, the conscious representation of what is not immediately present to the senses. However, while creativity relies on imagination, innovation relies on action and is defined as the act or process of introducing new ideas, methods or approaches (Mooradian et al., 2016). Action may be of equal importance to the entrepreneur. The process of creativity leading to an innovative output begins with sheer curiosity and inquisitiveness (Moberg et al., 2014) as well as a desire for nonconformity, or as Davis et al. (2016) put it, a preference and desire to act in a unique way and stand out from the crowd.

A person with a creative and innovative lens believes in experimenting and is open to learning through iterative approaches. Experimentation and iteration often begin with the generation of many ideas (Davis et al., 2016) as well as an openness to trying multiple methods, and adapting solutions through an effectual and non-linear process (Stauffer, 2015).

4. Belief and confidence in one’s own capacity and competency to be entrepreneurial

Valerio et al. (2014) show how the belief in one’s capacity and competency for producing a desired result or effect (an entrepreneurial outcome) is a key attribute of entrepreneurial mindset. This includes feelings of trust in one’s abilities, qualities and judgment. Commonly referred to as self-efficacy, this general belief is a key driver of desired results and effectiveness in any context (Midgley et al., 2000; Moberg et al., 2014; Mooradian et al., 2016). Mitchell and Shepherd (2010) and Pfeifer et al. (2016) refer to this as entrepreneurial self-efficacy, which they defined as the belief in one’s capability to successfully conduct entrepreneurial tasks.

Self-efficacy is driven by self-belief, self-confidence and self-esteem and are all related to having confidence in one’s own abilities for entrepreneurial behaviour (Moberg et al., 2014; Taulbert and Schoeniger, 2010).

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Entrepreneurs have the need for a degree of independence and autonomy in their work and a preference to assess and initiate things independently (Taulbert and Schoeniger, 2010; Moberg et al., 2014; Stauffer, 2015; Totem Inc., 2015; Mooradian et al., 2016). This is driven by a feeling of having the power, authority and ability to be entrepreneurial. The desire to work with a high degree of independence (Davis et al., 2016) is less about working alone than not functioning well in restrictive environments without a degree of freedom (Cromie, 2000, p. 21).

Initiative and personal responsibility, however, is not taken lightly but is carefully thought through with self-reflection and a conscious effort to grow and improve in the effectiveness of one’s responses to challenges (Taulbert and Schoeniger, 2010; Totem Inc., 2015).

7. A pursuit of goal-attainment through personal mastery and value-creation

Begley and Boyd (1986) argued that entrepreneurs have a higher desire than non-entrepreneurs to achieve. Putta (2014) even describes this desire as an ‘insane hunger to achieve’. The need for achievement is accelerated through goal-setting and the establishment of stretch goals (Mooradian et al., 2016). Totem Inc. (2015) show how entrepreneurs have a desire for achievement that is at a very high level, where one is resolute and determined to achieve set goals (Moberg et al., 2014).

However, the path taken to achieve the goal is less important as long as the result is achieved. Totem Inc. (2015) refers to this as contextual goal orientation, where the drive is goal attainment without the need to follow a fixed plan. In addition, goals are often not set for achievement sake, but for the sake of learning, the opportunity for personal mastery (Dweck et al. 1995; Midgely et al., 2000), and by the creation of value for others (Totem Inc., 2015).
In Pursuit of a Better Understanding of and Measure for Entrepreneurial Mindset

8. Recognising opportunities
An entrepreneurial mindset allows one to readily recognise and pursue opportunities, and not to be resource dependent but rather resourceful with whatever means are at one’s disposal (Taulbert and Schoeniger, 2010; Putta 2014).

Sarasvathy (2001) refers to this as the ability to deal skillfully and promptly with a specific opportunity or problem with limited tools or means. Sarasvathy called this effectuation and showed how it is related to finding opportunities for innovation even with limited resources. Totem Inc (2015) describe this as resourcefulness. Davis et al. (2016) called this a preference for limited structure where entrepreneurs are free to be adaptable and from the boredom of following structured tasks.

9. Grit and perseverance in the face of challenges
One of the key factors of a growth mindset is related to understanding that effort, or ‘earnest, strenuous attempts’ are required to achieve goals and overcome challenges (Dweck et al., 1995; Putta, 2014). And, one of the rewards that effort brings, like goal attainment, is an opportunity for personal mastery. Dweck (2006) refers to effort as the path to personal mastery. Further to displaying effort, Dweck goes on to show how these types of individuals embrace challenges and persist in the face of setbacks.

Persistence, commitment and determination are widely cited as prominent characteristics of entrepreneurial mindset (Moberg et al., 2014; Totem Inc., 2015; Davis et al. 2016). Tenacity, persevered effort, or grit (Mooradian et al., 2016; Duckworth et al., 2007) is often coupled with an ability to bounce back after failed attempts or setbacks. Valerio et al. (2014) show how resilience is developed when consistent effort and tenacity is displayed. Yet the objective, once again, is not to only obtain the goal, but to allow for increased personal mastery and an increased ability to adapt and discover and use contingencies (Sarasvathy, 2001).

A central focus of the programmes developed by Taulbert and Schoeniger (2010) was dealing with the fear of failure, which as Mitchell and Shepherd (2010) show, requires seeing failure as an opportunity to learn and to determining what affordable failure is.

10. Taking risks that lead to learning, growth and value
Valerio et al. (2014) and Moberg et al. (2014) show how people with an entrepreneurial mindset have the propensity to take risks but the propensity is closely related to the degree of risk loss. Sarasvathy (2001) called the degree of risk loss ‘affordable’ or ‘acceptable risk’, where decision making is guided by what one is willing to risk for the desired outcome. This is by no means frivolous risk taking, but calculated and deliberative as entrepreneurs calculate risk very carefully and are generally moderate, rather than high risk takers (Caird, 1991; Cunningham and Lischeron, 1991; Drucker, 1985). Calculation of risk also considers the longer-term viability of the opportunity or problem, and drives a level of thinking that is beyond the immediate situation and seeks to consider the future carefully (Putta, 2014; Davis et al., 2016).

Such carefully calculated risk acceptance is described by Davis et al. (2016) and Mooradian et al. (2016) as a willingness to pursue a desired goal when the probability of succeeding is low, but even though the probability may be low, the relative potential value, risk return and the opportunity for learning is favourable.

11. A belief on one’s ability to influence
Taulbert and Schoeniger (2010) state that entrepreneurs have a desire to influence the character development and behaviour of others. The underlying drivers for this may vary but are generally driven by the increased likelihood for goal attainment though others, especially when other people can offer more value than oneself to the task at hand. Sarasvathy (2001) shows how this emphasises the development of strategic alliances, co-operative strategies and pre-commitments to create access to new markets and to reduce or eliminate uncertainty and barriers to entry.
The desire to influence and lead may be contrary to the level of autonomy detailed earlier in this paper, but one must note that the purpose is goal attainment and the entrepreneur will need to see through this lens to know when it is better to prioritise independence and when it is better to work with others.

In order to influence and provide leadership to others, a degree of social confidence is required. This includes the ability to be assertive in social environments, to meet new people and build relationships with confidence (Moberg et al., 2014).

In research conducted by Davis et al. (2016) they referred to the importance of a ‘interpersonal sensitivity’ for entrepreneurs, however, their research did not show a strong correlation between interpersonal sensitivity and entrepreneurial behaviour. They included it as an entrepreneurial mindset because they suspected that if entrepreneurs increased their awareness of the feelings, motivations and beliefs of the people around them, they could be even more effective. They proposed this for future research but found little evidence of it during their studies at the time.

Dweck (2016) in her unpacking of growth mindset described the ability to be able to celebrate the successes of others rather than feeling threatened or jealous. Celebrating the success of other people is driven primarily by the lessons and inspiration that can be found in sharing these experiences. The desire and openness to celebrate other’s success may further drive one’s openness to influence others toward such successes.

**Summary of Entrepreneurial Mindset Dimensions from the Literature Review**

Table 7 summarises the entrepreneurial mindset dimensions that have been extracted from the literature review. This summary forms the basis of Part 2 of the study that seeks to find an appropriate measure for entrepreneurial mindset and the underlying entrepreneurial mindset dimensions.
Table 7: List of Entrepreneurial Mindset Dimensions from Literature Review

<table>
<thead>
<tr>
<th>Underlying Entrepreneurial Mindset Dimensions (# of underlying references)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to exploit contingencies (1)</td>
<td>Independence (2)</td>
<td></td>
</tr>
<tr>
<td>Achievement orientation (1)</td>
<td>Initiative (2)</td>
<td></td>
</tr>
<tr>
<td>Action orientation (2)</td>
<td>Innovation (2)</td>
<td></td>
</tr>
<tr>
<td>Adaptability (2)</td>
<td>Insane hunger to succeed (1)</td>
<td></td>
</tr>
<tr>
<td>Ambition (2)</td>
<td>Internal locus of control (4)</td>
<td></td>
</tr>
<tr>
<td>Antagonism (1)</td>
<td>Interpersonal sensitivity (1)</td>
<td></td>
</tr>
<tr>
<td>Autonomy (1)</td>
<td>Iterative (1)</td>
<td></td>
</tr>
<tr>
<td>Benefiting others (1)</td>
<td>Learns from criticism (1)</td>
<td></td>
</tr>
<tr>
<td>Calculated risk-taking (1)</td>
<td>Malleable behaviour (1)</td>
<td></td>
</tr>
<tr>
<td>Conscientiousness (2)</td>
<td>Mastery-orientated (3)</td>
<td></td>
</tr>
<tr>
<td>Consistent passion and interest (1)</td>
<td>Mediationnal judgement (1)</td>
<td></td>
</tr>
<tr>
<td>Context of relevance: More dynamic, nonlinear, and ecological (1)</td>
<td>Motivation (3)</td>
<td></td>
</tr>
<tr>
<td>Contextual goal-orientation (1)</td>
<td>Nature of the unknown: Focus on the controllable aspects of an unpredictable future (1)</td>
<td></td>
</tr>
<tr>
<td>Creativity and imagination (3)</td>
<td>Need for achievement (3)</td>
<td></td>
</tr>
<tr>
<td>Curiosity (1)</td>
<td>Need for empowerment (1)</td>
<td></td>
</tr>
<tr>
<td>Dealing with uncertainty (1)</td>
<td>Neuroticism (1)</td>
<td></td>
</tr>
<tr>
<td>Decision Making: Decisions made by what one is willing to risk (1)</td>
<td>Nonconformity (1)</td>
<td></td>
</tr>
<tr>
<td>Decision Making: Explores what else could be possible with given means (1)</td>
<td>Open to collaborate and partner (1)</td>
<td></td>
</tr>
<tr>
<td>Decision Making: Focused on the process and adaptable learning journey (1)</td>
<td>Open to feedback (1)</td>
<td></td>
</tr>
<tr>
<td>Desire to influence others (3)</td>
<td>Open to experiences (1)</td>
<td></td>
</tr>
<tr>
<td>Determination (2)</td>
<td>Opportunity recognition (2)</td>
<td></td>
</tr>
<tr>
<td>Dynamism and complexity (1)</td>
<td>Optimism (1)</td>
<td></td>
</tr>
<tr>
<td>Effectual (1)</td>
<td>Passionate (2)</td>
<td></td>
</tr>
<tr>
<td>Effort-oriented (2)</td>
<td>Passion for entrepreneurship (1)</td>
<td></td>
</tr>
<tr>
<td>Embrace challenges (1)</td>
<td>Persistence (4)</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial identity aspiration (1)</td>
<td>Planning ahead (1)</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial intention (1)</td>
<td>Preference for a limited structure (1)</td>
<td></td>
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<tr>
<td>Entrepreneurial motivation (1)</td>
<td>Probabilistic (1)</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurial self-efficacy (3)</td>
<td>Recognise Patterns and Linkages (1)</td>
<td></td>
</tr>
<tr>
<td>Extraversion (1)</td>
<td>Reflective (1)</td>
<td></td>
</tr>
<tr>
<td>Feeling of empowerment (1)</td>
<td>Resilience (1)</td>
<td></td>
</tr>
<tr>
<td>Finds lessons and inspiration in the success of others (1)</td>
<td>Resourcefulness (2)</td>
<td></td>
</tr>
<tr>
<td>Flexibility (2)</td>
<td>Responds rather than reacts (1)</td>
<td></td>
</tr>
<tr>
<td>Future focused (1)</td>
<td>Risk-orientation (4)</td>
<td></td>
</tr>
<tr>
<td>General self-efficacy (3)</td>
<td>Self-belief and self-confidence related (6)</td>
<td></td>
</tr>
<tr>
<td>Goal-oriented (1)</td>
<td>Tenacious (1)</td>
<td></td>
</tr>
<tr>
<td>Goals set for learning sake (1)</td>
<td>Tolerance for failure (3)</td>
<td></td>
</tr>
<tr>
<td>Idea generation (1)</td>
<td>Underlying logic: To the extent we can control the future, we do not need to predict it (1)</td>
<td></td>
</tr>
</tbody>
</table>
Part 2: In Pursuit of a Better Measure for Entrepreneurial Mindset

Based on the proposed shared understanding of entrepreneurial mindset and the entrepreneurial mindset dimensions identified in Part 1, Part 2 aims to explore the measurement of entrepreneurial mindset and the appropriateness of current tools in measuring the dimensions identified thus far. This will be achieved by reviewing literature associated with the measurement of these constructs as well as reviewing the research methodologies used in identifying the entrepreneurial mindset dimensions (Table 7, p. 24). Lastly, based on the limitations of each of these tools in measuring entrepreneurial mindset dimensions, a recommendation for the development of a revised tool is put forward.

Several psychological tests have been used in an attempt to better understand the nature of entrepreneurs. These include the Thematic Apperception Test (TAT), Edwards’ Personal Preference Schedule, the Honey and Mumford Measure of Learning Styles, Jackson’s Personality Inventory (JPI) and the more commonly used Myers-Briggs Type Indicator (MBTI).

Caird (1993) showed how the application of these psychological tests reveal the following characteristics of entrepreneurs:

- a high need for achievement, autonomy, change and dominance
- a low need for deference, abasement, affiliation and order
- characteristics of risk-taking, energy and social adroitness
- a preference for learning through action and pragmatism
- a preference for intuition and thinking

However, Caird went on to identify challenges and limitations relating to the use of psychological tests to better understand the nature and attributes of entrepreneurs. These include the various definitions for an entrepreneur, the numerous characteristics associated with entrepreneurs and uncertainty regarding which characteristics are more significant than others.

Following the findings of Part 1 of this study, which included multiple definitions and nuanced understandings of entrepreneurial mindset, as well as numerous characteristics associated with entrepreneurial mindset, the challenges that Caird identified must be kept in mind when exploring instruments that claim to measure attributes relating to entrepreneurial mindset.

Measurement of Entrepreneurial Mindset from the Literature Review

What follows are brief descriptions of survey instruments used as part of research studies reviewed above (for this study) that sourced the data and led to their findings related to entrepreneurial mindset.

Following the findings of Borland (1974) and Begley and Boyd (1986), characteristics such as an internal locus of control are evident in people with a higher propensity for entrepreneurship. In this study an instrument used by Levenson (1973) to measure locus of control in psychiatric patients was adapted to measure the same construct among entrepreneurs and non-entrepreneurs. Levenson had developed several statements related to the subsets of locus of control, namely internal control and chance control where respondents would rate the extent to which they agree with the statements, for example ‘my life is determined by my own actions’, which is related to the subset of internal control.
Several studies relating to entrepreneurial mindset have used a scale developed by Durham University Business School called the General Enterprise Tendency Test (GET2). Based on a response of either ‘tend to agree’ or ‘tend to disagree’, respondents are requested to respond to a series of 54 statements. GET2 was designed to measure characteristics relating to what they call an ‘enterprising tendency’, which includes the need for achievement, autonomy, creative tendency, calculated risk-taking as well as internal locus of control.

Robinson et al. (1991) developed a 10-point Entrepreneurial Attitude Scale (EAS), ranging from strongly agree to strongly disagree that measured entrepreneurial attitude orientation. The scale’s four subsets are the need for achievement, personal control, innovation and self-esteem. By focusing on attitude theory, the EAS sought to step away from the dominant personality trait approach to studying entrepreneurship. Robinson et al. hoped that the scale and the application of attitude theory would allow for the increased prediction of entrepreneurial behaviour.

Dweck et al. (1995) in their research related to growth (incremental) and fixed (entity) mindsets developed several statements in a Likert-scale survey to measure the degree to which respondents displayed either of these two mindsets. They divided these statements across three subsets: intelligence, morality and perspectives of the world. Similar surveys have been developed over the years to measure fixed vs. growth mindsets, however, with little evidence of validation of these scales.

Following the work of Bandura (1977) and Ajzen (1991, 1988) on the theory of planned behaviour, social cognitive theory, and self-efficacy, Vesper (1996) designed scales to measure entrepreneurial self-efficacy based on the stages of venture creation. These scales, related to the stages of searching, planning, marshalling and implementing, have been used widely to determine entrepreneurial self-efficacy and are often included as a component of other instruments designed to measure entrepreneurial mindset.

Similarly, because entrepreneurial intention is rooted in the theory of planned behaviour, instruments that measure entrepreneurial intention are commonly used to predict entrepreneurial behaviour.

Peng et al. (2012) defined entrepreneurial intention as a mental orientation (such as desire, wish and hope) influencing their choice of entrepreneurship. Multiple scales measuring entrepreneurial intention exist. Most notably, Thompson (2009) developed a 6-aggregate scale that measures not only entrepreneurial intention but also entrepreneurial self-efficacy, the attractiveness of entrepreneurship as a profession, its social valuation, and one’s entrepreneurial capacity.

In their relating to grit, Duckworth et al. (2007) designed a 12-item grit scale which splits its statements between the subsets of consistency of interests and perseverance of effort. In 2009, Haynie and Shepherd developed a Metacognitive Resource Scale, which focused on goal orientation and metacognitive knowledge, experience, monitoring and control. Ahmetoglu et al. (2011) developed a Measure of Entrepreneurial Tendencies and Abilities (META) scale that measures entrepreneurial creativity, level of proactivity, and entrepreneurial awareness and vision.

More recently, Moberg et al. (2014) developed an entrepreneurial mindset measurement scale in a project called ASTEE, and Davis et al (2016) developed an Entrepreneurial Mindset Profile (EMP).

The ASTEE project objective was to establish a common set of tools for measuring the impact of entrepreneurship education on European students’ entrepreneurial competencies across all education levels. ASTEE developed a self-rating scale across various dimensions related to entrepreneurial mindset including creativity, managing ambiguity, marshalling of resources, teamwork, entrepreneurial intention, locus of control, self-esteem, self-efficacy and entrepreneurial mindset. The items relating specifically to entrepreneurial mindset focused more closely on innovative problem solving. While the instruments developed by ASTEE appear robust, at this point there is very little evidence for the reliability and validity of the instrument.

The EMP Davis et al. (2016) developed was designed to measure the personality traits, motivations, attitudes and behaviours that contribute to entrepreneurial activity. They also sought to address the challenges of how efforts to measure these constructs have been ineffective and have ‘proceeded in a piecemeal fashion’ in the past (Davis et al., 2016, p.21).
Davis et al. started by identifying a list of possible dimensions that might characterize entrepreneurs and contribute to entrepreneurial success. To do so, they focused on research related to the traits and motivations of individuals and that of entrepreneurial organisations. They also had conversations with entrepreneurs in order to determine any attributes not revealed through academic investigation.

Key insights from Davis et al. on the development of their instrument include:

- Measured specific dimensions rather than broad domains to yield meaningful associations with entrepreneurial behaviour.
- During the scale-development process, they realised a distinction between more “personality-like” attributes and others that were more closely related to “skills”. Like fixed and growth mindsets they found that the personality-like attributes were slightly less malleable than those that they categorised as skills.
- By applying the question “Is there evidence that this dimension can be altered by training practice or intervention”- they determined whether to categorise the attribute as less malleable (personality traits) and more malleable (skills).

From the 14 dimensions that they identified, 7 of which were labelled personality traits and 7 labelled skills, they drew from some pre-existing scales (Torrance 1968) to develop their instrument. Other scales were developed by the authors independently to measure each dimension.

The process leading to version 2 of the EMP was broadly as follows:

- The initial version of the instrument included 118 items that were administered online to a convenience sample of 300 working adults.
- Two exploratory factor analyses (EFA) were carried out to evaluate the adequacy of the initial set of items. (EFA is a technique that inductively identifies the best-fitting solution for a given set of data.)
- From the findings, a second version of the instrument was developed.

- The revised version was tested with two sample groups that included corporate managers and entrepreneurs, with the intention of determining the tools effectiveness at differentiating between entrepreneurs and non-entrepreneurs. A total of 725 respondents were included.
- Further EFAs were conducted and the items that were loaded most highly underwent another set of EFAs to determine the items with the highest loadings and maximise reliability of testing the construct or dimensions that it claims to test for.
- With the revised version of the survey, a confirmatory factor analysis (CFA), a technique that assesses the degree to which a hypothesised model can reproduce the observed item co-variances, was conducted to assess how well the EMP fits the existing data.
- The EMP was assessed using multiple methods including EQS (Bentler 1995), the non-form fit index (NNFI), comparative fit index (CFI; Bentler 1990, 1995), the goodness-of-fit index (AGFI; Jorskog & Sorbom 1988) and the root mean square error of approximation (RMSEA).

Davis et al. (2016) conclude by proposing a case for validity and reliability of the tool due to the steps taken in its design and further studies comparing the results of the EMP to results of other assessments mentioned earlier in this study, including a measure of the Big Five, as well as two further measures of divergent thinking showing some notable correlations in their findings.

### Appropriateness of Tools for Measuring Identified Entrepreneurial Mindset Dimensions

From this overview, it is evident that various instruments have been used to measure specific dimensions of entrepreneurial mindset. Depending on the focus of the research, several of these instruments include validated scales adapted from the personality and cognitive psychology fields.
However, none of the measurement tools identified are individually able to measure all or even a significant percentage of the entrepreneurial mindset dimensions identified in the literature review (Table 7). Ideally, a combination of these tools is required for a comprehensive measure of these dimensions. It is also noted that some dimensions were initially measured using qualitative or mixed method approaches, necessitating the development of quantitative items for these dimensions.

Proposed Measure for Entrepreneurial Mindset

Based on the limitations of current tools in measuring the entrepreneurial mindset dimensions identified in Part A (Table 7), the development of a quantitative survey is proposed. This survey is to be piloted, tested, and refined in South Africa, with the intention to later be replicated in other countries.

This survey is differentiated from previous measures in that it aims to measure the dimensions identified in this study while using the underlying literature reviewed and the entrepreneurial mindset definition proposed as a basis for its development.

A quantitative survey using Likert Scale questions (Likert, 1932) and possibly Semantic Differential questions (Osgood et al., 1957) are proposed, but more research is required to determine which of these are most effective. Initial relevant demographic questions can be included to better differentiate among respondents’ core characteristics, which may include age, gender, employment/vocational status, and level of education. Further in the development of the survey, validated and publicly available scales were used first, with the creation of scales being a secondary step so that maximum validity of the scale items are ensured.

Further research and expertise will be required to refine the pilot survey and ensure that it is sufficiently valid and reliable for replication in other contexts beyond South Africa.
Part 3: Conclusion and Future Research Considerations

This paper is intended to explore a better understanding of and measure for entrepreneurial mindset, which in turn will serve as a foundation for discussions about the development of future research areas.

In order to better understand entrepreneurial mindset, the genesis of mindset was explored chronologically to form a strong contextual base from the behavioural sciences. To ensure that entrepreneurial mindset is understood beyond those specific vantage points proposed by specific researchers. Thereafter, and following a similar chronological structure, the development of entrepreneurial mindset within the behavioural sciences was explored in depth. The literature culminated in a specific focus on more recent contributions to the field.

Based on the chronological literature review, a summary of emerging themes was presented followed by several definitions for entrepreneurial mindset. A shared understanding of entrepreneurial mindset was then proposed, along with a tabulated list of entrepreneurial mindset dimensions from the literature review.

This paper then reviewed how mindset, and entrepreneurial mindset, has been measured to date, highlighting the successes and some limitations with these measures. With the successes and limitations in mind, a recommendation for a universal measure for entrepreneurial mindset was then tabled.

The development of an entrepreneurial mindset survey can lead to significant opportunities for future research, both for the AGOF, GERN and other organisations, institutions, and stakeholders.

Future study may include building of a shared understanding of entrepreneurial mindset, introducing a data-based system for measuring progress of entrepreneurial development interventions, and a foundation for an evidence-based framework in which to develop policy and program recommendations.

Apart from the development of the survey, this literature review can also serve as a starting point for the AGOF, GERN and other organisations to adopt a research-based understanding of entrepreneurial mindset, and to use the literature to serve as a guide for the refinement of their own programs and policies relating to entrepreneurial mindset. Although a broad overview is presented by this paper, further research can be conducted on specific areas related to entrepreneurial mindset, which may better align to the organisation and its areas of influence.
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