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Intrinsic and Phasic Entrepreneurial Alertness for Opportunity Recognition: An Analysis of Asian Entrepreneurs

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Abstract

Entrepreneurial alertness (EA) is pivotal in opportunity recognition, yet the origins and processes underlying EA remain elusive. Drawing upon key insights from the neuroscience and entrepreneurship streams of literature, our study classifies EA into intrinsic and phasic components to delve into the entrepreneurial opportunity recognition process. Intrinsic EA—a self-initiated top-down control mechanism—continuously processes information to generate unconstrained associations from entrepreneurial schemata. As gatekeepers, intrinsic EA pre-processes external stimuli and internal thoughts, aiming to produce novel insights that may manifest as potential opportunities or threats. This triggers phasic EA, a short-term, bottom-up process with a selective focus on the insights. Phasic EA employs experiments to assess the attractiveness of first-person opportunities, refining entrepreneurial schemata. Utilizing 52 video interviews of 11 mainland Chinese, Taiwanese, Singaporean, and Indian entrepreneurs, our research distinguishes between intrinsic and phasic EA, delves into their origins, and presents a unified framework to elucidate their respective roles in entrepreneurial opportunity recognition.

Keywords: Entrepreneurial alertness; Intrinsic EA; Phasic EA; Schemata; Entrepreneurial ventures; Asian Entrepreneurs

Introduction

Entrepreneurial alertness (EA) is a crucial force behind entrepreneurial success (Tang et al., 2012; Lanivich et al., 2022). Originally proposed by Kirzner (1979), EA was initially viewed as the ability to spot opportunities without undertaking an exhaustive search process. Subsequent research has refined our understanding of the cognitive foundations of EA (Tang et al., 2012). EA allows entrepreneurs to interpret their entrepreneurial experiences and surroundings distinctively from other managers due to variations in their mental frameworks (Valliere, 2013b). Rooted in social cognitive theory, EA operates through the three core components of searching and scanning, association, and evaluation of entrepreneurial opportunities (Tang et al., 2012). These components are fundamental for value creation (Ardichvili et al., 2003; Gaglio & Katz, 2001; Kirzner, 1983; Lanivich et al., 2022; Tang et al., 2012, 2021) and for the adept navigation of environmental changes, facilitating entrepreneurial opportunity recognition (Valliere, 2013b).

Despite the valuable contributions of extant literature, gaps remain in our current understanding of how already-alert entrepreneurs are initially incentivized (McCaffrey, 2014). Does EA arise from exogenous shocks (Kirzner, 1979)—provided that entrepreneurs possess rich scripts from entrepreneurial knowledge and experience (Baron, 2006; Valliere, 2013b)? Or is it a chronic status (Patel, 2019; Roundy et al., 2018) that originates in and facilitates the satisficing navigation of entrepreneurship (Sarasvathy & Dew, 2005)? Given this disagreement, some scholars suggest that EA directly influences opportunity recognition by enhancing receptivity to external cues (Ardichvili et al., 2003; Kirzner, 1983, 1997; Shane, 2012; Shane & Venkataraman, 2000). Others have proposed that EA indirectly helps entrepreneurs spot opportunities by remaining mindful of relevant information and available resources (Alvarez & Barney, 2007; Araujo et al., 2023). The split between EA's direct or indirect relationship with opportunities further begs the question: How does EA contribute to opportunity recognition?

Current research investigates the cognitive origins of EA and how EA contributes to opportunity recognition. First, delving into the "alertness" aspect can provide deeper insights into the origin and

functionality of EA. As Davis (1971) observed, a single phenomenon can, in reality, be composed of heterogeneous elements. Similarly, neuroscientific research has identified two distinct categories of alertness: (i) *self-initiated*—long-term vigilance, known as intrinsic alertness, and (ii) *cue-induced*—temporarily enhanced preparedness for target stimuli, termed phasic alertness (Clemens et al., 2011; Nasiri et al., 2023; Sturm & Willmes, 2001). Intrinsic alertness, as one of the mindfulness skills, is endogenously regulated, characterizing receptive information processing while inhibiting distraction and interference (Jankowski & Holas, 2014; Petersen & Posner, 2012; Sturm & Willmes, 2001). In comparison, phasic alertness is activated whenever a warning cue precedes the target stimuli, facilitating selective attention and featuring increased processing speed and efficiency (Haupt et al., 2019; Petersen et al., 2017; Sturm & Willmes, 2001). We propose that this differentiation of alertness brings up the possibility that EA can be categorized into two distinct types: (i) intrinsic EA, which is internally driven by entrepreneurs to maintain the level of alertness and refrain from distraction and deviation, and (ii) phasic EA, which represents the entrepreneurs heightened sensitivity to warning cues, with increased processing speed and efficiency toward target stimuli.

Second, synthesizing neuroscience and entrepreneurship literature, the current research further excavates how intrinsic and phasic EA interact with entrepreneurial schemata and how these interactions uniquely contribute to entrepreneurial opportunity recognition. The entrepreneurial schemata are like mental maps that help entrepreneurs spot patterns and predict trends (Baron, 2007). Fueled by entrepreneurial motivations, intrinsic EA sustains vigilance for processing information and generates associations by drawing upon entrepreneurial schemata. Novel and probable associations, manifesting as third-person opportunities or threats, are “good” associations that activate phasic EA. While third-person opportunities align with entrepreneurs’ opportunity-seeking mindset, threats are adverse conditions that can impede opportunity exploitations. Triggered by the novel associations provided by intrinsic EA, phasic EA orients responses to specific threats and potential opportunities. Mobilizing resources and using trial and error learning, phasic EA evaluates the first-person opportunities, refining their entrepreneurial schemata.

To investigate the construct validity of intrinsic and phasic EA and how they contribute to opportunity recognition in distinct yet coherent ways, we collected self-narrative data from the Chinese mainland, Taiwan, Singapore, and Indian entrepreneurs. We chose these regions due to the sustained growth in entrepreneurship that has taken place in these countries over the past decade (Acs et al., 2019) and the presence of returnee entrepreneurs who have played a vital role in the formation of new ventures (Kenney, 2013; Zhou & Hsu, 2011). This approach provided fresh insights into the cognitive processes involved in entrepreneurial trajectories across different contexts.

Our findings advance the understanding of entrepreneurial opportunity recognition by categorizing EA into intrinsic and phasic types. Informed by neuroscience and entrepreneurship literature, our research provides a nuanced perspective on EA, resolving debates on its origins and expanding qualitative boundaries. Specifically, the distinction between intrinsic and phasic EA elucidates entrepreneurial motivation as the genesis of EA. Notably, our research positions intrinsic and phasic EA as pivotal skills for entrepreneurial opportunity recognition. The unified framework demonstrates that entrepreneurial opportunity recognition involves mental simulations of intrinsic EA and experimental evaluation of phasic EA. While intrinsic EA enhances novelty through unconstrained associations, phasic EA ensures the attractiveness of opportunities to be pursued. The opportunity recognition process also entails applying and expanding entrepreneurial schemata through intrinsic EA and refining schemata through phasic EA. By elucidating a greater variance of opportunity recognition, our findings offer practical insights for entrepreneurs to maintain and train EA for opportunity pursuit.

Theoretical background

Entrepreneurial alertness (EA)

EA plays a pivotal role in entrepreneurship as the essential link between innovation, opportunity recognition, and economic benefits (Valliere, 2013a). With enhanced EA, entrepreneurs are more confident in their innovation (Ashourizadeh et al., 2014) and capabilities (Cui et al., 2016). EA also mediates the positive influence of entrepreneurial passion (Syed & Mueller, 2015), mitigates path

dependence lock-in effects (Heffernan, 2003), and fosters organizational learning (Lee et al., 2016). EA is integral to new venture creation (Baron, 2007; Forbes, 1999; Lanivich et al., 2022) and positively impacts firm-level performance (Chavoushi et al., 2021).

Initially coined by Kirzner (1979, p.48), EA is defined as "*the ability to notice without search opportunities that have hitherto been overlooked."* (Kirzner, 1979). Despite widespread recognition, this conceptualization has faced criticism for its vague nature and limited empirical applicability (Sharma, 2019). Valliere (2013b) emphasizes the importance of schemata, defining EA as manifestations of entrepreneurial schemata used to make sense of environmental changes.

Entrepreneurial schemata, abstract representations premised on actors, roles, and relations, serve as mental templates guiding alert entrepreneurs in connecting diverse elements (Baron, 2007). Shaped by prior knowledge, experience, and situated condition (Valliere, 2013a), an entrepreneur's schemata reflect a subset of shared domain-specific knowledge and individual uniqueness (Simonton, 2003). Schemata structures sensory input interpretations and causal expectations while adapting to the current situation (Valliere, 2013a). Variations of schemata may offer better or worse payoffs (Csaszar & Levinthal, 2016), while richer, more granular, and cross-linked schemata crucially contribute to entrepreneurial opportunity recognition (Valliere, 2013b). Accordingly, scholars proposed that the operationalization of EA should implicitly encompass entrepreneurial schema (Gaglio & Katz, 2001).

However, it is unclear whether the schemata differences between entrepreneurs and normal managers exist before entrepreneurial actions or emerge during opportunity pursuit (Alvarez & Barney, 2007). Moreover, schemata are inherently abstract and imperfect (Csaszar & Levinthal, 2016), and the novelty and utility of ideas depend on entrepreneurial judgment (Roundy et al., 2018). Therefore, though entrepreneurial schemata are cognitive foundations of EA, it is important not to conflate EA with entrepreneurial schemata.

In the context of opportunity recognition, an entrepreneurial opportunity is "an idea or dream that is discovered or created by an entrepreneurial entity and that is revealed through analysis over time to be potentially lucrative" (Short et al., 2010, p.48). Opportunity recognition includes not only the detection of

potential opportunities but also the evaluation of them (Shane & Venkataraman, 2000; Short et al., 2010). Understanding the pivotal role of EA in opportunity recognition, Tang et al. (2012) operationalized EA as comprising the core factors of scanning and search, associations and connections, and evaluation and judgment. These factors illustrate how EA actively adapts and develops schemata to discover and assess opportunities (Tang et al., 2012).

Tang et al.'s (2012) operationalization implicates EA's dual relations with schema, which involves both forward-looking, searching, and scanning of schema and backward-looking, evaluation, and judgment of schema. Scholars suggest that opportunity recognition requires a process that begins with forward-looking searching and observation, followed sequentially by backward-looking experimental learning for optimal accuracy (Gavetti & Levinthal, 2000). However, a trade-off exists between these forward and backward-looking activities, with excess schema searching potentially impeding energy for experimental evaluation (Csaszar & Levinthal, 2016). Building on Davis's insight that seemingly single phenomena comprise heterogeneous elements (1977), we propose that EA comprises two distinct components, each characterized by a predominant interaction with schemata.

Neuroscientific foundations for intrinsic and phasic EA

We delve into the cognitive root of alertness to understand EA's interaction with its cognitive foundation—the entrepreneurial schemata. Insights from neuroscience reveal that alertness, as the basic element of attention intensity, takes on two distinct forms: intrinsic and phasic alertness (Sturm & Willmes, 2001). Based on neuroscience, intrinsic alertness involves long-term maintenance of alertness level (Sturm & Willmes, 2001). It is self-initiated and guided by internal factors rooted in prior knowledge (Clemens et al., 2011; Nasiri et al., 2023). Processing both external information and internal train of thought, intrinsic alertness maintains vigilance to potential stimuli of interest (Mottaghy et al., 2006). Practical daily examples of intrinsic alertness include bypassing obstacles and seeking solutions when riding a bike, driving a car, following classes, and solving math problems (Mottaghy et al., 2006).

In contrast, phasic alertness represents a short-term adaptive increase in preparedness triggered by warning cues (Haupt et al., 2019; Mottaghy et al., 2006; Sturm & Willmes, 2001). Examples of phasic

alertness in daily life include heightened states when hearing the fire alarm, waiting at a traffic light, or expecting an incoming call (Jaeger et al., 2021; Nasiri et al., 2023). It is important to note that the warning “cues” triggering phasic alertness are like guideposts pointing to the target "stimuli." These warning cues can either belong to the same category as the target stimuli (e.g., fire alarm and fire) or be entirely unrelated (e.g., noticing something unrelated to the call) (Posner, 2008; Sturm & Willmes, 2001).

Using neuroimaging, scientists have discovered that alertness is closely connected to the right-hemisphere networks (Sturm & Willmes, 2001). It is important to note that significant differences exist in how the brain's networks are activated for intrinsic and phasic alertness (Sturm & Willmes, 2001). In intrinsic alertness, the activation is confined to the right hemisphere and follows a top-down process from the control region to the information-processing areas in the brain (Sturm & Willmes, 2001). On the other hand, phasic alertness is triggered by warning cues and involves heightened activation in the right hemisphere and additional activation in the left hemisphere; this suggests heightened alertness and neural connections to selective attention (e.g., Clemens et al., 2011; Psotta et al., 2021; Sturm & Willmes, 2001). Moreover, phasic alertness also crucially extends to motor areas of the brain (Yanaka et al., 2010).

Accordingly, intrinsic and phasic alertness differ in their respective working mechanisms. Intrinsic alertness receptively processes information, demonstrating a "windshield wiper effect" that rhythmically clears the clutter of incoming information while inhibiting interference and distraction. (Sadaghiani et al., 2010). It demonstrates a delayed enhancement of processing speed, which gradually increases for a longer period (Sturm & Willmes, 2001). Conversely, phasic alertness is rapidly evoked by warning cues but short-lived, facilitating focused attention to specific stimuli (Sturm & Willmes, 2001). The presence of warning cues elicits the "warning effect" in phasic alertness, manifesting in decreased response time, lowered threshold of conscious perception (Petersen et al., 2017), higher processing speed (Haupt et al., 2019), better motor preparedness (Yanaka et al., 2010), and motor execution (Psotta et al., 2021). Importantly, its connection to selective attention facilitates resource mobilization (Haupt et al., 2019).

By detecting novel cues, intrinsic alertness can temporarily shift to a phasic alertness state within milliseconds (Psotta et al., 2021). In this case, phasic alertness "hijacks" the circuit of intrinsic alertness (Mottaghy et al., 2006). Scholars have shown that this adaptive switch from intrinsic to phasic alertness is controlled by the connection hubs in the neural system (Sadaghiani et al., 2010).

Mirroring their alertness counterparts in neuroscience, EA can be further categorized into intrinsic and phasic EA. Akin to intrinsic alertness, intrinsic EA is internally motivated and persistent, and it processes information receptively, sustaining entrepreneurial vigilance by self-monitoring (Jankowski & Holas, 2014). Akin to phasic alertness, phasic EA is cue-induced and short-lived, orienting responses to warning cues and facilitating resource mobilization.

Intrinsic and phasic EA and entrepreneurial opportunity recognition

Opportunity recognition involves detecting ideas as potential opportunities and assessing their relevance and value to entrepreneurs (Shane & Venkataraman, 2000). The former pertains to identifying third-person opportunities that can be profitable for individuals with specific knowledge or expertise, while the latter involves evaluating first-person opportunities that appeal to entrepreneurs (Haynie et al., 2009). Drawing on neuroscience, we explore the predictors, core features, alert functions, and mechanisms of intrinsic and phasic EA. This examination helps us define each type and explain their synergistic contributions to opportunity recognition.

Concerning the predictors, the motivated account of intrinsic EA indicates that it is driven by entrepreneurial motivations rather than predefined schemata (Gaglio & Katz, 2001). Intrinsic EA emphasizes sustained vigilance and receptive processing of the environment cues, identifying driving forces, crucial factors, and possible outcomes (Gaglio & Katz, 2001). Therefore, the information processed by intrinsic EA involves external information and an internal train of thought.

We propose that the core feature and working mechanisms of intrinsic EA mirrors these of the generic, intrinsic alertness. Due to its core feature of executive control, intrinsic EA may initially exhibit a delayed enhancement in processing speed, which gradually improves over time. Intrinsic EA exerts its alertness function mainly by inhibiting distraction rather than expediting processing. The working

mechanism of intrinsic EA involves receptively processing information and forming hypothesized associations using entrepreneurial schemata. It is important to note that intrinsic EA is not constrained by existing schemata; it can utilize or dramatically revise them to form previously non-existent associations (Gaglio & Winter, 2017). This process resembles the stochastic, blind association proposed by Campbell (1960). French mathematician and physicist Henri Poincare´ (2022) describes this vividly, stating that "the mobilized atoms are . . . not any atoms whatsoever; they are those from which we might reasonably expect the desired solution. Then the mobilized atoms undergo impacts which make them enter into combinations among themselves or with other atoms at rest which they struck against in their course" (p. 389). With higher levels of intrinsic EA, entrepreneurs actively challenge and reshape the status quo by extending or modifying their schemas (Baron, 2007; Gaglio & Winter, 2017).

Moreover, intrinsic EA mentally simulates associations before manifesting externally (Simonton, 2003). As illustrated in the windshield wiper effect, intrinsic EA proceeds this processing rhythmically, producing a great number of associations (Simonton, 2010). Among these, the novel and probable associations typically suggest third-person opportunities or threats, which align with the entrepreneurial mindset of opportunity-seeking. These associations then activate phasic EA. Thus, intrinsic EA receptively pre-processes information and narrows it down to the preferential focus of phasic EA. The transition from intrinsic to phasic EA is similar to the transition from blind variation to selective retention by Campbell (1960).

The warning cues identified by intrinsic EA serve as predictors for phasic EA. Phasic EA also lowers the activation threshold, making it more responsive to such cues (Roundy et al., 2018). Similar to phasic alertness, phasic EA is reactive and transient, quickly engaging with but diminishing more rapidly than intrinsic EA. It fixates attention on the potential opportunities and threats directed by novelty cues. As no entrepreneurs will "see the end from the beginning, " opportunities can only emerge with reiterated actions and reactions (Alvarez & Barney, 2007). Accordingly, the working mechanisms of phasic EA encompass active scanning, selectively searching relevant information, and mobilizing resources, enabling it to assess possible means-end relationships (Sarasvathy, 2001; Zellweger & Zenger, 2021).

With reiterated experiments, phasic EA further refines the evidence boundaries of specific schema while putting a limit on the harms of failures (Gavetti & Levinthal, 2000; Zellweger & Zenger, 2023). Sociological impact weighs in at the stage of phasic EA, whereby entrepreneurial evaluations are influenced by the market response and constrained by contextual factors (Valliere, 2013a). Therefore, unlike the receptive mental process of intrinsic EA producing unconstrained associations, phasic EA is a focused evaluation process using trial and error constrained by context. In conclusion, while intrinsic EA provides novelty cues as raw materials (Baron, 2007), phasic EA thoroughly evaluates the opportunities' attractiveness. Phasic EA concentrates intensely on relevance and value assessment, transforming third-person opportunities into actionable first-person opportunities (Haynie et al., 2009).

In line with intrinsic alertness—as defined in neuroscience and highlighting its relationship with entrepreneurial schemata—we termed intrinsic EA as *the self-initiated arousal of entrepreneurs, which regulates and sustains attention to and receptively pre-processes information, employing and expanding entrepreneurs' schemata.* While intrinsic EA, as entrepreneurs' tonic alertness, implies motivated attention to perceive and interpret daily information by invoking and innovating entrepreneurial schemata, phasic EA entails heightened and selective attention to target information preceded by cues, validating specific associations. Accordingly, we termed phasic *EA as entrepreneurs' cue-induced, heightened attention toward potential opportunities, experimenting, and verifying specific entrepreneurial schema.* With the pre-processing of intrinsic EA and targeted handling of phasic EA, entrepreneurs act as scientists, constructing hypotheses based on their beliefs and cognition, testing and validating them, and updating them accordingly (Zellweger & Zenger, 2021). Therefore, intrinsic and phasic EA work sequentially and integrally to recognize attractive entrepreneurial opportunities. We summarized the above insights in Table 1.

Table 1. Comparison between EA, Intrinsic EA, and Phasic EA.

	EA (Tang et al. 2012)	Intrinsic EA	Phasic EA
Definition	The process and skills are based on entrepreneurial schemata, which allow entrepreneurs to interpret their entrepreneurial experiences and surroundings distinctively from other managers.	Self-initiated arousal of entrepreneurs, which regulates and sustains attention to and receptively pre-processes information, employing and expanding entrepreneurs' schemata.	Cue-induced, heightened attention of entrepreneurs toward potential opportunities, experimenting, and verifying specific entrepreneurial schema.
Predictors	Individual disposition Trading and experience Social networks	Entrepreneurial motivations	Warning cues
Activated neuro-network		Right-hemispheric cerebral network	Bilateral activation: enlarged areas in the right-hemispheric cerebral with additional left hemispheric cerebral network
Core feature	Cognitive capacity and proactive stance	Internally controlled level of arousal	Extrinsically induced change in preparedness
Alertness functions	Provide unique preparedness of alert entrepreneurs, responding to and processing new information cues, and developing entrepreneurial opportunities.	Delayed enhancement of processing speed, which gradually increases over a longer period. Inhibiting interference and distraction Maintaining vigilance	Rapidly evoked but short-lived processing speed change. Shorter reaction time, increased speed of information uptake. Lowering perception threshold. Facilitating selective processing of stimuli. Resource recruitment and mobilization.
Components of working mechanism	Alert Scanning and Search	Receptive information processing (wind shielding effect)	Selective scanning and search (warning effect)
	Alert Associations and Connections	Unconstrained association generation	Resource mobilization
	Alert evaluation and judgment	Mental simulation of associations	Testing and Evaluation
Outcomes	Opportunity discovery and creation: Venture startup activities/outcomes	Delivery of novel and probable cues, triggering phasic EA	Opportunity recognition

Method

Our qualitative research explored the distinct forms of intrinsic and phasic EA and how they contribute to recognizing entrepreneurial opportunities. The complexity of the entrepreneurial cognitive process and the exploratory nature of our study entails an in-depth understanding of entrepreneurs' perceptions, interpretations, and reactions in the daily operation of their businesses and at times of great uncertainty. Therefore, we deemed a case study approach appropriate for our research to decipher the dynamics and reveal rich stories (Eisenhardt, 1989). To gain a holistic and dynamic understanding of the cognitive foundation and the processes of intrinsic and phasic EA, especially in emerging economies, we engaged in theoretical sampling (Eisenhardt & Graebner, 2007) to collect interviews and self-narrative videos of eleven entrepreneurs from Asian countries.

Sampling and data collection

Our sample selection was based on several criteria to ensure within-case pattern detection and cross-case comparisons. First, we chose self-narratives and interview videos to obtain first-person narratives. Unlike articles or videos illustrated from a third-person perspective, first-person narratives are richer in detail and less biased. Second, all our sample entrepreneurs are from Asian countries, including mainland China, Taiwan, Singapore, and India. Our deliberate choice of a broader sampling base across Asia enabled a more comprehensive exploration of common themes and greater generalizability, which is fundamental for theory development. In addition, all the above regions have experienced a significant uptick in entrepreneurial activity over the past decade, as reflected in the rise of the Global Entrepreneurship Index or National Entrepreneurial Context Index (Acs et al., 2019; *GEM*, 2023). Third, we selected entrepreneurs born in the 1980s or 1990s. Setting an age limit helped minimize generation-based gaps in entrepreneurial propensities (Zhang & Acs, 2018).

Fourth, we collected longitudinal videos for each of our sample entrepreneurs between 2013 and 2023. All the ventures involved existed for over two years, with businesses covering media, electric cars, sports cameras, games, content creation, B2B software, human resource management, logistics, e-commerce, and digital platforms. Analyzing data from resilient entrepreneurs who weathered the

pandemic and remained active in their industries provided valuable insights into how they navigate external uncertainty and ambiguity in emerging markets. Longitudinal data helped us follow the entrepreneurial process trajectory; the diversity of business areas enabled us to detect entrepreneurial process patterns generalizable to different industries. Fifth, we compared entrepreneurs' interpretations of the same event at various times to understand their personal and venture development. Finally, we triangulated the self-narrative data using text interviews and online reports. We ended up collecting 52 videos totaling 768 minutes in length. To ensure accuracy and equivalence in meaning, we performed back-translation for videos with only Chinese transcripts and ended up with scripts consisting of 64,751 English words. We present the background data of our sample entrepreneurs in Appendix A and a representative sample of the collected video and blog in Appendix B.

Data analysis

Based on the elements outlined in Table 1, we operationalized the following criteria to first discern intrinsic and phasic EA, as detailed in Table 2 below.

Table 2. Coding Criteria for Intrinsic EA and Phasic EA.

Intrinsic EA:
1. Perceived vigilance in daily encounters.
2. Sustained alertness for seeking entrepreneurship-related information over time.
3. General receptivity towards daily information processing.
4. Creative and unconstrained associations generated.
5. Novelty of detected third-person entrepreneurial opportunities or threats.
Phasic EA:
1. Sensitivity to third-person opportunities or threats.
2. Heightened alertness upon detection of third-person opportunities or threats.
3. Selective and focused information searching and scanning.
4. Resource mobilization to evaluate potential opportunities.
5. Using trial and error for evaluating potential opportunities.

Regarding the specific components of intrinsic and phasic EA's working mechanism, we coded activities driven by motivation and characterized persistent and receptive information processing as *receptive processing* of intrinsic EA. We specified phasic EA's *information scanning and searching* as the

selective scanning and searching of information related to the opportunities. We further coded activities of mentally forming and simulating associations as *association generation* and *mental simulations* of intrinsic EA. On the other hand, pooling resources and physically testing the specific solutions are coded as *resource mobilization* and *testing and evaluation* for phasic EA, respectively.

Our study's unit of analysis was an entrepreneur–decision–making event. Using each decision-making point revealed in the entrepreneurs' narratives, we located those involving certain decision-making events. We then used syntactic rules to determine the causal relationships, particularly the connecting points between activities. Finally, we retained the decision-making events with obvious links to the causes and outcomes of the events and finally obtained 42 sets of events from eight entrepreneurs. We thoroughly discussed all 42 events until we reached a consensus on them and summarized them in the Supplementary Materials.

Findings

Our qualitative analysis provided valuable insights into how our sample entrepreneurs leveraged both intrinsic and phasic EA to recognize entrepreneurial opportunities. Notably, several key themes emerged from our data analysis.

Motivations driving intrinsic EA.

Human behaviors are the consequences of knowledge and desire (Locke, 2000). Entrepreneurial behaviors stem from entrepreneurial desire (McMullen & Shepherd, 2006), encompassing motivations such as entrepreneurial passion (Campos, 2017; Cardon et al., 2009), aspirations related to entrepreneurial identity (Farmer et al., 2011), vision, fear of failure (Murnieks et al., 2020), and more basic survival or necessity-driven need (Refai et al., 2018). These values and needs, accompanied by strong emotions, crucially drive entrepreneurial decisions (Locke, 2000). Notably, to acknowledge time-related variations in entrepreneurial motivations (Shipp & Cole, 2015), attention should also be directed to goals as situation-specific expressions of entrepreneurial values (Locke, 2000). These goals set criteria that shape information acquisition and maintenance strategies (McMullen & Shepherd, 2006).

Our sample entrepreneurs discussed their motivations, including values and goals. We discovered that motivations were generally overarching and relatively stable over time, reflecting the entrepreneurial inclination towards embracing challenges to seize opportunities (Baron, 2004; McMullen & Shepherd, 2006). Conversely, goals were observed to be more dynamic, varying across different stages of entrepreneurship for all participants.

For example, EN02 consistently articulated entrepreneurial motivation as "to serve the customer well" in various entrepreneurial contexts. However, EN02's goals underwent evolution, transitioning from an initial aim of achieving positive cash flow in the first five years to a later objective of attaining a 20% market share of new energy cars in China by 2025. This trend of evolving goals was a common thread amongst all sample entrepreneurs of our study.

Entrepreneurial goals were seen as realistic adjustments according to current circumstances, as highlighted by EN09, *"But I think that journey towards that became a lot longer than we ever expected… there are just so many areas you need to improve."* These specific goals provided a tangible expression of the entrepreneurs' values. For instance, EN04's earlier interviews emphasized his ambition and excitement about entrepreneurship. In his latest role as CEO of a gaming firm, this vision took on a more specific form: "*It is very simple: world-level quality made in China. Based on our domestic game developing level, we do have a chance to reach world-level quality. The road will be long, and this is our goal.*"

All sample entrepreneurs exhibited a heightened tonic arousal and inhibition of deviation, attributing these characteristics to their entrepreneurial motivations. EN10 emphasized the role of a clear mission statement: *"how we stay focused…one of the things that we do is we're very anchored by our mission statement… to inspire every person in the world to start selling and buying."* This concentration maintains persistent information processing, initiating knowledge acquisition and schemata construction. For instance, EN05 expressed his entrepreneurial goal of observing and documenting the lives of regular people, which drove him to accumulate expertise and construct schemas related to creating quality programs.

The pre-processing role of intrinsic EA

Our findings illuminate that intrinsic EA is a continuous process marked by self-driven control in information pre-processing. EN04 highlighted the role of interests in fostering "*long-term thinking and accumulation,*" asserting that engaging in activities one loves naturally leads to diligence. Similarly, EN11 detailed his persistent monitoring of the app's functionality, explaining, "*As a product person, I watch my emotions in a way. If I can do my work seamlessly and calmly. That's a very good thing. Without having to think. If the app irritates me, I get irritated. That's when I know it is not right*."

Individuals with heightened intrinsic alertness display increased arousal levels (Haupt et al., 2019), allowing for receptive processing of information that others might ignore. This information may originate from the external environment or through internal reflection. EN10 emphasized the value of external feedback, stating, *"Wherever you go people are telling you about the problems and complaints. We really appreciate suggestions."* In contrast, EN09 underscored the importance of self-reflection, stating, *"But the more we did it, the more we realized that fashion business wasn't necessarily our forte."*

Entrepreneurs in our sample showcased their continuous efforts to enrich the intricate information within their schemata bank, distinguishing themselves from the crowd (Gaglio & Katz, 2001). EN02 emphasized the importance of developing a personal cognitive structure through constant learning and listening, stating, "*You need to develop your own cognition structure through constant learning and listening.*" EN11 echoed this sentiment and gathered, *"Reading is my thing…random books…you never know when it will be useful…More the information you download into your brain, you're able to use it sometime."*

Moreover, our sample entrepreneurs demonstrated a creative generation of associations that consistently expanded their knowledge boundaries (Baron, 2007). EN06, upon encountering 360-degree video shooting, not only appreciated the concept's coolness but also reflected on the associated technical challenges and complexities. Similarly, EN10 highlighted how their venture began by noticing unused old gadgets, leading them to participate in a hackathon to build an app. In summary, our sample entrepreneurs exhibited a commitment and readiness to disrupt their schemata in association generation (Gaglio & Winter, 2017).

Our entrepreneurs provided insights into their thought process of information searching and scanning, accompanied by mental simulations to compare associations. These thought processes help produce novel insights. For instance, EN08 reflected on their daily observations of modern communication, comparing it against their hypotheses of how communication should be: *"For people in this generation, modern people, very few people are willing to sit down and listen to other people's stories and difficulties. So, in the end, we are not giving advice or recommendations, but feeding back to them about what WE experienced and felt…what people want to do is just give you, THEIR advice."* Likewise, EN06 shared his mental simulations when encountering a 360-degree video shoot: "*The pictures and videos produced are quite stunning… But at that time, it was very difficult to make pictures and videos like this.*"

Limited schema richness can result in less accurate perceptions of novelties. For instance, EN01 realized his company faced financial trouble due to his inadequate financial sense, admitting, "*I was struck by the fact that there was only 400 thousand (RMB) left... I had no idea of cash flow.*" Similarly, EN02 experienced a significant team departure due to poor management, underscoring his lack of knowledge in navigating such circumstances. On the other hand, the lack of accuracy due to less intricate schemata can be compensated with higher levels of intrinsic EA, characterizing unconstrained association in detecting more novel opportunities often overlooked by others. Just like EN11 remarked, people who are "*fresh out of college…. better than the person who's doing it for 20 years as you don't come with a baggage."*

Triggering phasic EA

Recalling how they shifted their lanes from e-commerce to logistics, which turned out to be very successful, EN09 reflected the detection of novel insights by intrinsic EA: *"when we moved to e-commerce, we saw a need for logistics. We were a bit frustrated with Singapore where the very core tenets of e-commerce - variety, transparency, and immediacy which a lot of companies neglected."* Novel insights passed down from intrinsic EA signal either third-person opportunities or threats, prompting heightened attention from entrepreneurs (Zheng & Mai, 2013). The essence of opportunity lies in

entrepreneurs recognizing and acting upon it before others, while threats pertain to issues critically linked to enterprise activities that can impede opportunity exploitation.

Novel insights can present third-person opportunities, as seen in EN05's observation of professional 360-degree video shooting. Likewise, EN03 noted that patrons at his coffee shops faced challenges due to information asymmetry: "*For example, an entrepreneur in heavy-duty internet products was troubled because he could not find investors."* This indicates the third-person opportunity of an efficient communication venue, triggering EN03's enhanced attention toward it.

The novelties delivered by intrinsic EA may also emerge as threats, as EN01 highlighted the problematic cash flow jeopardizing his company's survival. Similarly, EN09, while deciphering the sorting algorithm for their parcel delivery business, mentally simulated and identified the threats of inefficiency, "*200 parcels took me two hours, 400 parcels it's not four hours, it's more than that. How am I ever going to sort a thousand?*" This detection of threats propelled them to *"set ourselves to start thinking, we start searching."*

Across our sample entrepreneurs, detecting third-person opportunities creates an 'Aha!' moment (Murphy, 2011). Third-person opportunities indicate that these opportunities are attractive to "someone" with the proper knowledge and motivation (Haynie et al., 2009). Detecting third-person opportunities aligns with entrepreneurs' opportunity-seeking mindset (Roundy et al., 2018), directing their attention to the potential for a first-person opportunity or whether the opportunity appeals to "me" (Haynie et al., 2009).

This "Aha!" moment amplifies the significance of potential opportunities, indicating the transition to preferential and intensive attention by phasic EA. For instance, EN05, upon detecting a third-person opportunity related to information asymmetry among coffee shop patrons, explored the idea of making his coffee shop a platform connecting investors and entrepreneurs. Likewise, EN04's perception of his future partner's integrity had led him to contemplate possibly starting a business with him. This prompted EN04 to meticulously evaluate the other person's strengths and weaknesses as a prospective business partner and formulate strategies to address potential limitations. EN05, recognizing the blue ocean in

interviewing normal people as a third-person opportunity, intensively assessed the first-person opportunity of gaining and monetizing internet traffic. We also observed this pattern in EN08, who, in the persistent exploration of possibilities to become a director, had stumbled upon the third-person opportunity of crowdfunding and its potential to revolutionize production: "*So, in the future, if you have one thousand to ten thousand loyal supporters, your business can go on forever*." This third-person opportunity had driven him to evaluate the first-person opportunity and seek solutions to find loyal followers.

Interestingly, surprises that indicate threats had catapulted our sample entrepreneurs to the alternative trajectory of opportunity seeking. This further aligns with the "creative jolt" effect through entrepreneurs' heightened and intensified attention (Toivonen, 2023). Creative jolts reflect the dramatic divergence from a core mission, which pitches the original threats into the new light of opportunities (Toivonen, 2023). EN01, reflecting on the fear generated by the firm's cash flow chain being completely broken during financial trouble, recognized the need for a different approach: "*As we were clear about resuming office work, every one of us tried our best to look for legitimate solutions*." This shift in trajectory led to the discovery of novel business opportunities during the pandemic, resonating with the scholarly perspective that heightened alertness and creative responses to threats are integral to opportunity recognition (Thompson, 1999).

Phasic EA for first-person opportunity recognition

Entrepreneurs with higher levels of alertness demonstrate a greater sensitivity to third-person opportunities and threats and a lower tolerance to leave them unattended (Gaglio & Katz, 2001). EN09 exemplified this, saying, *"From there, we are like, why don't you start something, like let's have a van and ship some goods."* Similarly, faced with a mass resignation incident, EN02 was determined to handle such events, stating that he would have closed the company and walked away if he had not been optimistic. Therefore, higher phasic EA lowers the threshold toward the third-person opportunities and threats intrinsic EA delivers.

Phasic EA involves heightened responsiveness, marked by selective searching and scanning. EN10 eloquently describes selective focus when addressing consumer experience problems: "*being laser-focused on what you set out to do and why you set up to do what you do in the first place*." This selective focus is consistently accompanied by intensive efforts, as EN09 emphasizes, "*When we promise something, we do or die to get it done*." EN01 exemplifies selective searching and scanning in detecting threats to cash flow, leading to a determination to resume work in the office. He demonstrated intensified alertness and adaptive decision-making, engaging all staff members in brainstorming and reviewing strategic planning to "*explore new frontiers*". They eventually got a chance to shoot a video for the government for free, which happened within just a couple of days.

Phasic EA is further characterized by resource mobilization, such as seeking external help, enabling entrepreneurs to overcome limitations of bounded rationality (Simon, 1979). EN08 recalled their first project's success through the involvement of a professional in the team, while EN02 recruited loyal followers when half of the employees left. Similarly, EN06 mentioned that their initial ideas had become more serious after securing investment, "*without which we do not even dare to think about making stuff like that. Because it is so ahead of time, without money, we cannot deliver the hardware*."

Resource mobilization also involves strategically marshaling existing resources. When EN09 detected the opportunity to enter the logistics business, he recounted, "*I'm sure we can solve the algorithm and supply chain problems*." EN09 later secured funding and successfully "*figured it out*." EN10 identified the potential for their C2C e-commerce business, prioritizing building a resonating product rather than seeking immediate funding.

Leveraging resource mobilization, our sample entrepreneurs further evaluated various options through trial and error. These trials and errors effectively reduced the opaqueness of the situation (Zellweger & Zenger, 2023). Our entrepreneurs commonly engage in multiple iterations to evaluate and refine specific alternatives (Zellweger & Zenger, 2023). In particular, juxtaposing alternatives against the negative and positive evidence contributes to successfully recognizing opportunities (Gavetti & Levinthal, 2000). EN06 aptly expresses this iterative process: "*So, keep trying to make mistakes and iterate.*"

Successful opportunity recognition forms a vital feedback loop, reinforcing entrepreneurs' engagement in phasic EA. The success of EN09 through entrepreneurial trial and error affirms the critical importance of "hustling" to deliver promises at all costs. The sample entrepreneurs further stress the importance of balancing intrinsic and phasic EA, noting that the former's novelty and precision influence the latter's effectiveness. EN09 is recognized for skillfully balancing thoughtfulness with a focus on action. Similarly, EN06 emphasizes that entrepreneurs should avoid using tactical diligence to mask strategic laziness, accentuating the preceding role of intrinsic EA.

Schemata validation

As the cognitive foundation of intrinsic and phasic EA, entrepreneurial schemata serve as the basis for association generation. Intrinsic EA employs creative associations, drawing upon and expanding entrepreneurial schemata, while phasic EA elaborates on specific alternatives and validates them. Through trial and error, entrepreneurs continually adapt the specific associations to the dynamic environment (Gavetti & Levinthal, 2000). Entrepreneurs refine their schemata after repeated iterations and testing. This mitigates concerns related to underfitting or overfitting, thereby ensuring precise links between entrepreneurial actions and outcomes (Hohwy, 2020). EN08 reflects on this process*: "Now I have already proved that my thoughts are plausible, I have my products, I have my stories, I have my ways, so I can use a different way to finance my movie*."

Schemata validation of phasic EA involves refining the richness and unique connections in schema (Baron, 2006; Valliere, 2013b). EN04 exemplifies this by highlighting the connections between investment and gaming development, indicating that the company's rapid growth in game development is closely tied to its investment decisions. Moreover, refined schema improves the cognitive foundation of intrinsic EA, fostering more accurate future associations. EN02, for instance, mentions learning better approaches over time and the importance of transforming problems into positive outcomes. Similarly, EN08 reflects on the success of combining bar-running with directing films: "*Besides the bar, I have always wondered whether there are any technologies that can help extend and expand our plan.*"

Our findings underscore the distinctiveness and connections between intrinsic and phasic EA for opportunity recognition. These EA processes are complementary and essential for entrepreneurs as they navigate the dynamic landscape of opportunities. We visualized the theoretical model in Figure 1 below based on our findings. The following section provides a more in-depth discussion of the findings.

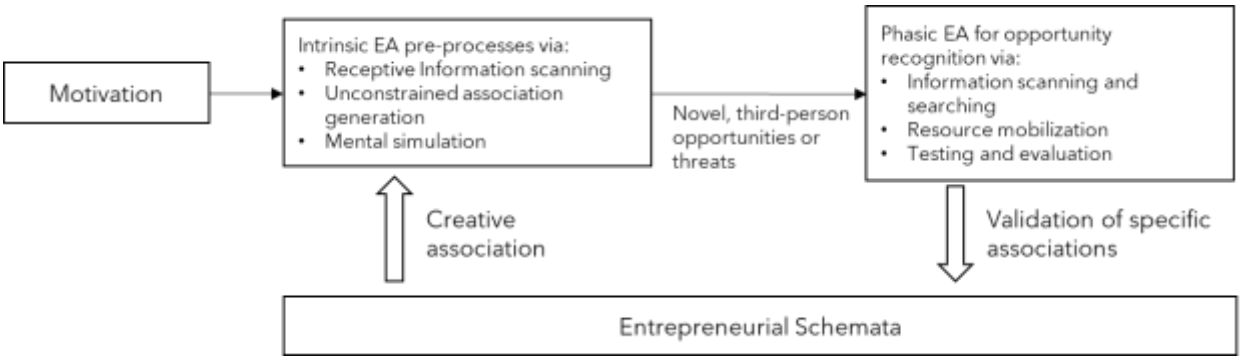

Fig.1 Proposed process model of intrinsic and phasic EA for opportunity recognition.

Discussion

As self-regulated mindfulness to daily information, intrinsic EA does not naturally happen but is consciously induced and practiced (Jankowski & Holas, 2014). Entrepreneurial motivation captures people's willingness to 'play' the entrepreneurial game (Shane, 2003). According to McMullen and Shepherd (2006), motivation addresses the 'alertness to what' question. Therefore, entrepreneurial motivation is intricately tied to intrinsic EA, sustaining intrinsic EA at optimal alertness level. Specifically, the beliefs of entrepreneurial values and instructions of specific goals (Locke, 2000) drive intrinsic EA to receptively process even mundane information over an extended period (Jankowski & Holas, 2014).

Entrepreneurial motivation is essential to prevent intrinsic EA from aimless wandering. Since the perceived importance of stimuli influences people's attention (Hohwy, 2013), our proposition suggests that motivation assigns greater value to information related to entrepreneurship. Consequently, while intrinsic EA processes all information, it aims to identify more original opportunities at earlier stages than

their peers (Hunter, 2013). Accordingly, entrepreneurial motivation initiates and hones intrinsic EA. Building on this rationale and our research findings, we propose:

Proposition 1. Entrepreneurial motivation drives intrinsic EA.

The mindfulness inherent in intrinsic EA involves purposeful and receptive attention to the present moment (Jankowski & Holas, 2014). This mindful approach facilitates the sustained processing of daily information, generating numerous associations. The rhythmic nature of intrinsic EA's information processing, described as the "windshield wiper" effect, effectively prevents information congestion (Sadaghiani et al., 2010). Consequently, the sustained mindfulness of intrinsic EA allows information processing to occur relatively automatically (Baron, 2006). Entrepreneurs, known for dedicating off-hours to information-seeking and scanning, exhibit persistent information-gathering behaviors (Kaish & Gilad, 1991).

Sustaining alertness over an extended period initially requires effort, yet it transforms into a rapid and more intuitive process with time. Like master chess players effortlessly predicting moves when walking past a game without even slowing and veteran nurses detecting signs in patients that demand urgent attention, intrinsic EA becomes almost second nature for entrepreneurs through intentional training and prolonged practice (Kahneman, 2003). Based on the above reasoning and our research findings, we propose:

Proposition 2. Intrinsic EA sustains entrepreneurial vigilance and receptively processes information.

Meanwhile, intrinsic EA's information processing is conscious rather than fully automatic. Fueled by entrepreneurial motivation, intrinsic EA remains vigilant to potential novel and probable information, akin to drivers paying attention to traffic and speed (Locke, 2000). In this processing, intrinsic EA utilizes schemata to interpret and mentally simulate cause-and-effect relationships without actual testing (Baron, 2007; Gavetti & Levinthal, 2000).

Existent schemata reflect the entrepreneur’s domain knowledge, which comprises shared field knowledge and unique personal background and experience (Simonton, 2003). The richness of stored schemata is important for the accuracy of intrinsic EA in detecting novelty, as limited richness can

constrain associative capacity (Baron, 2004, 2007; Li et al., 2015; Valliere, 2013b). However, the existing schema alone is insufficient for generating novel associations. Higher levels of intrinsic EA distinguish an entrepreneur from an experienced manager. Though experienced managers possess extensive ready-made schemata, lower levels of intrinsic EA limit the originality in generating novel associations (Simonton, 2003).

Most associations by intrinsic EA are swiftly cleared up without yielding significant insights, making the stumbling upon useful ones rare (Simonton, 2003). However, as Louis Pasteur famously remarked, “Chance favors only the prepared mind” (as cited in Simonton, 2003, p. 479). With its relatively unconstrained associations, intrinsic EA persistently seeks useful and novel permutations (Campbell, 1960).

Proposition 3. Intrinsic EA facilitates creative associations by utilizing or blowing up existent schemata.

While intrinsic EA handles massive information receptively and tirelessly generates associations, the "good associations" matter for creative output (Simonton, 2003). These associations win the competition for the selective attention of entrepreneurs. Scientists posit that preferential attention toward a specific association is the multiplicative product of three elements: utility, subjective probability, and level of alertness (Bundesen et al., 2015). Utility involves identifying features that are highly important to individuals (Bundesen et al., 2015). In the entrepreneurial context, utility means the existence of novel opportunities that are original, surprising, and unattended, which aligns with the entrepreneurial mindset of opportunity-seeking (Jankowski & Holas, 2014; Roundy et al., 2018). Utility can also involve threats that could harm the firm’s ability to exploit opportunities (Hunter, 2013).

Subjective probability indicates the existence of prior occurrences or the expectancy of future occurrences (Bundesen et al., 2015). For entrepreneurs, subjective probability relates to the likelihood of occurrence of potential opportunities or threats. Since intrinsic EA characterizes non-specific processing, the probable opportunities pre-processed by intrinsic EA are third-person opportunities, which anyone with requisite knowledge and experience can benefit from. Likewise, probable threats refer to potential adversities that can harm the firms' capacity to exploit future opportunities. Hence, the "good," or novel

and probable, associations produced by intrinsic EA ultimately manifest as novel third-person opportunities and threats for entrepreneurs. Novel, third-person opportunities and threats act as warning cues triggering phasic EA, directing attention to evaluating first-person opportunities.

A higher level of phasic EA lowers the activation threshold, further facilitating the selective attention to novelties passed by intrinsic EA (Haupt et al., 2019). Moreover, phasic EA skills can be trained. Neuroscience scholars have shown that effectively using warning cues trains phasic alertness, whereas warning cues not followed by expected stimuli result in decreased levels of phasic alertness (Finke et al., 2012). That is, the practice of phasic alertness is reinforced by positive feedback. Gavetti and Levinthal (2000) further proposed that experimental wisdom accumulates with the reinforcement of prior results. Therefore, novel, third-person opportunities and threats activate phasic EA, while successful opportunity recognition reinforces phasic EA through a feedback loop. Consequently, the elevated level of phasic EA, honed with training, serves as the third element that contributes to the preferential attention of the cues passed on by intrinsic EA. Based on the above reasoning and our findings, we propose:

Proposition 4. Intrinsic EA detects novel third-person opportunities or threats, thereby triggering phasic EA, and higher levels of phasic EA further facilitate this activation.

The highly selective attention and limited bandwidth of phasic EA zoom the entrepreneurial attention on the third-person opportunities (Galinsky & Moskowitz, 2000; Gavetti & Levinthal, 2000; Markman & McMullen, 2003; Zellweger & Zenger, 2023) delivered by intrinsic EA. It is crucial to emphasize that these third-person opportunities do not automatically translate into entrepreneurial prospects without a thorough evaluation (Short et al., 2010). Opportunity evaluation, as a forward-looking process, determines the ultimate appeal of these ideas to entrepreneurs (Short et al., 2010).

Opportunity evaluation commences with information scanning and searching to assess attractiveness. Attractiveness hinges on expected future returns and their relatedness to the entrepreneurs (Haynie et al., 2009). Expected returns signify the anticipated improvements in efficiency and effectiveness and the wealth that can be generated upon implementing these actions (Haynie et al., 2009). This evaluation of expected return also involves appropriateness concerns based on societal, cultural, and

political norms (Valliere, 2013a). Motivated entrepreneurs always seek congruence in their interactions within social networks (Kerr & Coviello, 2020). Meanwhile, strong ties may lead to shared cognition or cognitive lock-in, while weak ties offer greater diversity (Kerr & Coviello, 2020). Opportunity evaluation usually involves navigating the tension between social or cultural norms and individual interests (Rindova et al., 2009). Therefore, the attractiveness evaluation of phasic EA involves information scanning and searching to determine expected returns and appropriateness aspects of the opportunities.

The relatedness dimension of attractiveness evaluation is intricately connected to resource compatibility (Haynie et al., 2009). Resources encompass technology, human capital, and other essentials for realizing opportunities (Haynie et al., 2009). Firms' profits depend on valuable, rare, and inimitable resources. Therefore, attractive opportunities typically require mobilizing pre-existing resources compatible with the opportunities and marshaling future resources (Haynie et al., 2009). Accordingly, phasic EA further involves resource mobilization to evaluate the attractiveness of opportunities. We propose:

Proposition 5. Phasic EA evaluates the attractiveness of first-person opportunities through information searching, scanning, and resource mobilization.

Opportunity evaluation is conducted within the problem space, encompassing entrepreneurs, resources, the current and end state, and the environment (Simonton, 2003). In the dynamic entrepreneurial landscape, many dimensions of this space remain ambiguous and ill-defined (Simonton, 2003). For example, entrepreneurs may face resource limitations and uncertainty about the end state of opportunities. Scholars unveiled that entrepreneurs creatively navigate the ambiguous problem space, acting as pilots in the air, employing trial and error until opportunities unfold (Sarasvathy, 2001).

Through trial and error, phasic EA aids in verifying specific associations (Alvarez & Barney, 2007), leading to the recognition of first-person opportunities. This iterative process refines the boundaries of potential solutions, causing a reevaluation of what was once deemed possible or impossible (Feduzi et al., 2022). Additionally, the experimental nature of this process enhances the granularity and richness of schemata, refining distinctions and incorporating additional attributes (Valliere, 2013b).

Finally, trial and error assist in gathering evidence to handle similar cases in entrepreneurship, adding to the development of prototype schemata. Prototype schemata are broad and abstract, representing the average characteristics of a category (Kahneman, 2003). Therefore, they are useful for handling emerging and related situations effectively (Baron, 2006) and without constraining the adaptive flexibility of EA.

Proposition 6. Phasic EA uses trial and error to test and evaluate first-person opportunities, validating entrepreneurial schema.

Implications and limitations

When asked where Nobel Prize winners got their best ideas, Anton Zeilinger, the 2022 Nobel Laureate in Physics, emphasized the power of persistent thought. He remarked: "*You just have to think about something, think about it, and think about it, and think about it; then, suddenly, it will come.*" This contemplative mindset resonates with alert entrepreneurs who possess the unique ability to sense promising opportunities. Like the scientists pondering minds, intrinsic EA immerses entrepreneurs in constantly contemplating matters related to entrepreneurship. Through immersive thinking, intrinsic EA hones entrepreneurs' attention, enabling them to discern novel ideas that might elude others and pass them on to phasic EA for further evaluation. With intrinsic EA as baseline alertness leading to phasic EA for heightened attention intensity, entrepreneurs can recognize opportunities that appear to 'come' to them naturally or with minimal effort (Alvarez & Barney, 2007; Tang et al., 2012).

Our research delved into the distinct processes of intrinsic and phasic EA and their connection to opportunity recognition. Analyzing 52 self-narrative and interview videos featuring eleven entrepreneurs from mainland China, Taiwan, Singapore, and India. Our findings differentiate between the sustained alertness linked to intrinsic EA and the heightened, orienting response of phasic EA. Intrinsic EA pre-processes information receptively through creative and semi-stochastic associations, ensuring the novelty for potential opportunities and threats that distinguish entrepreneurs from typical managers. These novelties trigger phasic EA. Phasic EA evaluates the attractiveness of opportunities, leading to the recognition of opportunities. With intrinsic EA ensuring the novelty of potential opportunities and phasic EA verifying their attractiveness, both components are integral to the opportunity recognition process.

Theoretical implications

Neuroimaging studies suggest that intrinsic and phasic alertness engage the right hemisphere, with the latter displaying heightened activity and involving expanded regions (Périn et al., 2010). Indeed, cognitive science studies have shown the differentiation between the intrinsic and phasic forms of alertness (Haupt et al., 2019; Matthias et al., 2009; Mottaghy et al., 2006; Périn et al., 2010); however, their exploration and clear distinction in the realm of entrepreneurial research has hitherto been limited (cf. Tang et al., 2012). Shedding light on the cognitive foundation of entrepreneurial schemata, our study breaks new ground by being the first, to our knowledge, to delve into the distinction between intrinsic and phasic EA.

This distinction addresses conflicting proposals from diverging research streams regarding the origins of EA and information sources. Prior research has delved into the crucial role of schemata as the cognitive roots of EA, with their richness, association, and priming preparing and heightening EA (Valliere, 2013b). However, as eloquently articulated by McCaffrey (2014), questions arise about the origins of the original schemata and whether exogenous shocks alone can activate entrepreneurial alertness. Expanding on schemata theory (Valliere, 2013b), our research further explores the origins that initiate schema accumulation—entrepreneurs' motivations. Our findings are underpinned by a wealth of evidence supporting the notion that entrepreneurial motivations play a pivotal role in propelling entrepreneurs in their routine activities of seeking, scanning, and evaluating both external information and internal trains of thought. The present research asserts that entrepreneurial motivation catalyzes intrinsic EA, which adeptly processes information from external stimuli and internal thoughts. The pre-processing of intrinsic EA yields novel insights, serving as the source that triggers phasic EA.

Importantly, our findings show that intrinsic and phasic EA exhibit the working mechanisms that align with the three factors of EA. However, intrinsic and phasic EA vary in their deliberation and the intensity of these factors. While intrinsic EA involves sustained yet unconstrained associations and mental simulations, phasic EA highlights experimental reiterations with heightened intensity. Therefore, our research corroborates and provides further evidence for Tang et al.'s (2012) three-factor model.

Additionally, it offers complementary insights, revealing more nuanced understandings of the different types of EA.

Our research further elucidates the essential process of opportunity recognition facilitated by intrinsic and phasic EA, contributing to the field of entrepreneurial cognition (Alvarez & Barney, 2007). Our findings indicate that intrinsic EA receptively pre-processes the information and passes novel third-person opportunities to phasic EA for further evaluation. Phasic EA evaluates the attractiveness of these third-person opportunities to recognize first-person opportunities. Phasic EA's proximal relation with opportunity recognition hinges upon the novelty delivered by intrinsic EA. Moreover, as indicated by the literature, the eventual opportunity recognition also depends on the trade-off between the intrinsic and phasic EA process: while extensive processing may take away the time for experimental evaluation, a greater focus on the latter may constrain the time spent on the former, and ultimately impacting the accuracy of novelty prediction (Csaszar & Levinthal, 2016). Both intrinsic and phasic EA play integral roles in opportunity recognition, emphasizing the need for entrepreneurs to maintain a balanced approach.

Our data's rich self-narratives also offer insights into the interactions between intrinsic and phasic EA and entrepreneurial schema. Intrinsic EA draws upon but is not constrained by existent schema. Instead, it features creatively utilizing or blowing up schema to generate associations. Meanwhile, schemata absence and inadequacy may contribute to intrinsic EA's lack of accuracy in delivering novel cues. By evaluating the novel cues as first-person opportunities, phasic EA elaborates and verifies the specific associations, validating and updating the mental models.

Moreover, despite the unconstrained nature of intrinsic EA, phasic EA reflects a constrained evaluation process. For example, in uncertain situations, when resources are scarce, or when the information used for decisions is hidden, power and social-influence play more significant roles in organizational decisions (Pfeffer & Salancik, 1974, 1978). These conditions emphasize that concerns about appropriateness impact the evaluation of opportunities' attractiveness, which phasic EA attentively addresses. Just as the Inca culture never upscaled the wheels of toy carts as transportation instruments

because of the unfavorable terrain, the checkpoints of phasic EA steer entrepreneurs away from any impractical or improper decisions.

Finally, our findings shed light on the context-specific nature of entrepreneurial opportunity recognition in Asian countries. This approach provides a more fine-grained and indigenous understanding of the dynamic interactions between intrinsic and phasic EA.

Managerial implications

Our research addressed long-standing paradoxes found within entrepreneurial practices. For instance, if entrepreneurs are always looking for opportunities, what role do surprises play in entrepreneurship (McCaffrey, 2014)? We propose a resolution by asserting that the constant search for opportunities and reaction to surprises are crucial elements of opportunity recognition. Furthermore, both aspects are intricately organized within the EA system, where both external and internal information undergo pre-processing by intrinsic EA. While intrinsic EA operates in a sustained, spontaneously conscious manner, phasic EA swiftly responds to surprises processed by intrinsic EA. This dynamic interplay between intrinsic and phasic EA allows entrepreneurs to navigate uncertainties effectively.

Second, as EA sets entrepreneurs apart from non-entrepreneurs (Valliere, 2013b), is EA an inherent trait of successful entrepreneurs? Our findings align with Tang et al.'s (2012) assertion that EA is a skill developed and trained through processual practices (Valliere, 2013b). Our data supports the idea that entrepreneurs are not inherently predisposed to be alert but are motivated to refine their sensitivity. Sustaining vigilance requires effort, and our data show that, with practice, entrepreneurs become more adept at alertness (Baron & Ensley, 2006). However, the accumulated experience can generate inertia, turning initial entrepreneurial successes into a liability (Gielnik et al., 2014; Ucbasaran et al., 2009). This paradox underscores the crucial role of entrepreneurial motivation in maintaining alertness. Without this driving force, EA can wane and become less effective.

Moreover, with practice, intrinsic EA driven by entrepreneurial motivations becomes second nature. This mastery empowers entrepreneurs to handle daily challenges primarily with intrinsic EA, reserving phasic EA for complex tasks. Neuroscience research reveals that older children excel at

inhibiting phasic alertness even with warning cues (Psotta et al., 2021). Likewise, seasoned entrepreneurs often exude a composed demeanor in managing routine challenges. Striking a balance between intrinsic and phasic EA is crucial. Hastily engaging phasic EA with only marginally novel cues may not yield fruitful opportunity recognition. Conversely, mere contemplation without proactive testing does not embody the true entrepreneurial spirit.(Shane & Venkataraman, 2000).

Last, how do alert entrepreneurs outperform their peers in evaluating entrepreneurial opportunities? Our findings indicate that entrepreneurs with higher phasic EA exhibit a greater sensitivity to these novel and probable cues and are adept at testing them out efficiently. This higher sensitivity aligns with entrepreneurs' opportunity-seeking mindset, facilitating transition from intrinsic EA to phasic EA. This transition is marked by either the 'Aha!' moments in contemplating third-person opportunities or by 'creative jolts,' which may turn threat-solving into opportunity-pursuit. Through concurrent trial-and-error experimentation, entrepreneurs work diligently to verify their ideas and find their own version of the philosopher's stone.

Limitations and future directions

Our research suffers several limitations that merit exploration in future studies. First, the context in which we sourced our data may limit the generalizability of our findings to entrepreneurs from different cultures or generations. Specifically, data drawn from China, Taiwan, Singapore, and India may not be generalizable to other Asia Pacific countries. Though the theoretical model synthesizes neuroscience and entrepreneurship literature and aims to unveil the overarching functionality of EA, future studies could investigate intrinsic and phasic EA's role in opportunity recognition by collecting data from other Asian countries with different levels of institutional support. Further, our sample entrepreneurs may have begun their ventures during the economic boom and thus held more optimistic business outlooks. Hence, their entrepreneurial pursuits may appear more opportunistic (Chen & Redding, 2017; Tang & Hull, 2012) or optimistic (Taormina & Lao, 2007). Therefore, a study examining intrinsic and phasic EA post-crisis would be interesting. Such studies could pay more attention to how the dynamic processes of intrinsic and phasic EA had shifted the entrepreneurial trajectory in the aftermath of external

shocks. Second, the qualitative nature of our research prevented us from examining how personal attributes moderate the functionalities of EA. For example, extensive research has revealed that highly creative people are endowed with unique personalities (Simonton, 2003). Quantitative studies could thus further explore the interactive effects of personal attributes on EA.

Third, while scientists argue that introspection in self-narratives and interview data provide valuable insights into cognitive research (Locke, 2000), it is likely that the current research is not immune to biases. Specifically, hindsight bias, whereby individuals struggle to accurately recall their thoughts about the possibility of an event before its occurrence, often causes individuals to oversimplify or rationalize it afterward (Kahneman & Riepe, 1998). Thus, differentiating between intrinsic EA and self-justification through entrepreneurs' reflective accounts is challenging. However, this reflection also clarifies previously unconscious undertakings, thus offering a valuable window into the spontaneously conscious processes of intrinsic EA. Still, future research could use real-time observation and interaction to glean more authentic reactions and attain a more fine-grained understanding of the intrinsic and phasic EA mechanisms involved in entrepreneurship.

Finally, current research suggests that entrepreneurs should maintain a balance between intrinsic and phasic entrepreneurial EA. Future studies could employ questionnaires to gauge levels of both intrinsic and phasic EA and investigate how specific configurations enhance efficient and effective opportunity recognition. Additionally, for future research aimed at developing empirical measures for intrinsic and phasic EA, we recommend using the criteria from our coding process as a foundation for scale development.

In conclusion, we hope our research sparks further exploration of intrinsic and phasic EA, providing insights crucial for launching and scaling ventures in emerging markets.

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Appendix A. List of entrepreneurs and Brief Background

Name	Year of birth	role	Entrepreneurial experience	The earliest year started the venture
EN1-Tianhong Pan (Tim)	1990s	Founder of Media Storm	In 2017 after graduating from the University of Kent, he came back to China to start his studio. From 2020 to 2022, won the awards of 100 biggest uploaders of Bilibili for three consecutive years. Up till November 2022, it has more than 5 million subscribers.	2017
EN2-Xiang Li	1981	Founder and CEO of PCPOP; Founder and CEO of Autohome Inc.; Founder and CEO of Li auto	In 2000, founded PCPOP; In 2005, founded Autohome Inc., which was listed in New York stock exchange in 2013; In 2015, founded Li Auto, which listed in Nasdaq in 2020	2000
EN3-Dandan Xu	1982	Founder of 3W coffee, founder and CEO of Beijing Lagou Network Technology Co.,Ltd	Graduated as a master from Peking University; In 2011, established 3W coffee; in 2013, established Beijing Lagou Network Technology Co.,Ltd	2011
EN4-Daniel Wu	1987	Co-founder and CEO of Hero Entertainment Co., Ltd.	Graduated from the University of Toronto In 2015, co-founded Hero Entertainment Co.,Ltd with Shuling Ying. In 2021, took over CEO position from Shuling Ying in Hero Entertainment Co., Ltd.	2015
EN5-Liangzi	1990	Founder and CEO of Bilibili channel "talking with Liangzi"	Graduated from the Ocean University of China, and later studied in Beijing Film Academy. In 2020, started the program "talking with Liangzi," which now enjoys over 10 million subscribers.	2020
EN6-Jingkang Liu	1991	CEO of Insta 360 and Arashi Vision Inc.	Graduated from Nanjing University In 2014 established a venture. In 2015, Insta 360 was officially set up. In 2020, changed the company's name to Arashi Vision Inc.	2014
EN7-Jiaxing Wei	1990s	CEO and founder of Telrobot	Graduated from Jiangnan University (master) In 2016, founded Nanjing Shenggou yinchuang information technology ltd. In 2017, founded Telrobot.	2016

EN8- Jiakai Xu (Jack)	1991	Director of the last thieves (Jun 2018 - Present · 4 yrs 6 mos); Founder of SELF PICK (Nov 2014 - Present · 8 yrs 1 mo) Founder of SELF TOKEN (Apr 2018 - Present · 4 yrs 8 mos)	Graduated from the National Taiwan University of Art In 2014, founded SELF PICK; In 2018, founded SELF TOKEN; In 2018, directed ted movie "the Last Thieves" which gained him the 56th Golden Horse Awards for best director; In 2019, founded SELF Oasis; Since 2020, hosted Podcast "things you dare not say to your boss."	2014
EN9- Liang Chang Wen	1987	Co-founder and CEO of Ninja Van (2014 - Present); Co-founder of Marcella Holdings (2014 - Present)	Graduated from Singapore Management University (SMU). In 2010, co-founded of Marcella Holdings; In 2014, co-founded Ninja Van; In 2016, honored on the inaugural Forbes 30 under 30 list. In 2017, was featured on The Peak Magazine’s Power List 2017.	2010
EN10- Quek Siu Rui	1988	Co-founder and CEO of Carousell (2012 - Present);	Graduated from the National University of Singapore In 2012, co-founded Carousell; In 2018, honored on the inaugural Forbes 30 under 30 list.	2012
EN11- Deepinder Goyal	1983	Co-founder and CEO of Zomato (2008 - present);	Graduated from Indian Institute Of Technology Delhi (IIT Delhi) In 2008, founded Zomato;	2008

Appendix B. Sample List of Video and Blogs[1]

Entrepreneur	Year	Link	Data type	Length (min)
EN1-Tim Pan	2021	https://www.youtube.com/watch?v=sXDwR0r_4-I	Video	25.25
EN2-Xiang Li	2021	https://www.bilibili.com/video/BV1Nv4y1f7fY/?spm_id_from=333.788.recommend_more_video.-1	Video	31.46
EN3-Dandan Xu	Jun-21	https://www.bilibili.com/video/BV1gb4y1d7P1/?spm_id_from=333.788.video.desc.click	Video	12.21
EN4-Daniel Wu	2019	https://www.youtube.com/watch?v=j2BJCzeNMUA	Video	25.44
EN5-Liangzi	Nov-22	https://www.bilibili.com/video/BV1xg41167Zn/?spm_id_from=333.337.search-card.all.click	Video	20.24
EN6-Jingkang Liu	Jun-22	https://www.bilibili.com/video/BV1mY411K7n1/?spm_id_from=333.788	Video	36.22
EN7-Jiaxing Wei	Jul-22	https://www.bilibili.com/video/BV1cF411N7VV/?spm_id_from=333.999.0.0	Video	7.16
EN8-Jack Xu	2021	https://www.youtube.com/watch?v=-lEEQcy15y8	Video	37.48
EN9-Liang Chang Wen	2016	https://www.youtube.com/watch?v=uEpOiUHh2B8	Video	53.26
EN10-Quek Siu Rui	2019	https://www.youtube.com/watch?v=-Q47KpAjFqw	Video	15.22
EN11-Deepinder Goyal	2023	https://www.youtube.com/watch?v=YOqOypHYXNk	Video	42.57

[1] Complete data upon request.

Supplementary Materials Entrepreneur – event summary

Entrepreneur-event	Construct coded	Brief illustration	Direct quote
EN01 - Event 1: Facing the uncertainty of COVID and financial trouble, the entrepreneur decided to dive into live streaming commerce.	Intrinsic EA	Receptive processing, Association generation, Mental simulation	Before the spring festival, I looked at the company account, I was struck by the fact that there was only 400 thousand (RMB) left... I had no idea of cash flow. I thought it should be ok, then I had the most unforgettable Spring festival: The Pandemic came.
	Intrinsic EA triggering phasic EA	Threats detected	I remember I checked the firm account several dozen times every day, always checking WeChat…..My deepest memory is on Feb 6. I paid for the employees, after which we had only 60000 RMB in our account….If there are any incidents, our cash flow chain will be completely broken.
	Intrinsic EA triggering phasic EA	Creative jolt	I only know that we can never get better if we keep working at home… As we were clear about resuming office work, every one of us tried our best to look for legitimate solutions. Unexpectedly, we found such a chance...We would like to do it for free, the only thing we wanted is the certificate of resumption of work.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	We need to explore new frontiers. I reviewed the strategies I made in 2019, and thought over which of them could be quickly initiated with a low cost…we finally decided to bet on one thing: live streaming…
	Schemata	Validation	We are a team that seeks constant progress. If we do not progress, we are not Media Storm anymore…The year of live streaming was a wonderful experience.
EN01 - Event 2: running into management issues when the company got big	Intrinsic EA	Receptive processing, Association generation, Mental simulation	I noticed that although we had more employees, efficiency and quality was horribly low… Then we kept recruiting more people, which is the simplest and dumbest solution, this is another form of escapism. Production, quality, human management, reward system, and the company environment all of these needs to be tackled by me, yet I am surrounded by all different chores and have no time to think about other things.

	Intrinsic EA triggering phasic EA	Threats detected - creative jolt	This is the biggest torture experience for the past year. COVID was hard, but I can come up with solutions. But now this question, I do not have solutions.
	Phasic EA	Testing and evaluation	Since I realized this is the worst moment, all I can do is to adjust bit by bit. I worked with the key personnel in the company combed through the business lines and conducted structural reform.
	Schemata	Validation	Although there are still many issues, the new studio gave all of us hope. It is the best affirmation of our hard work and represents so many things. Hope is the most important thing to a venture.
EN01 - Event 3: reflecting about motivation and personal strategy in deciding the company's goal to make short videos	Motivation	Value	What I gain fulfillment and the feeling of existence no longer comes from games. Now I obtain all these through making interesting content with my colleagues and gaining recognition from viewers.
	Motivation	Goals	Making one good video is not so difficult; what matters most and most difficult is to consistently produce good content...My self-perception is very clear: I am still a newbie…It is not that once you learn this then you know other things.
EN02 - Event 1: deciding on the time to enter the market to grab opportunities when changing lanes from PCPOP to Autohomes, inc.	Motivation	Value	So, if you are taking the same route as others who are leading the race, you will always be following in their steps. So, when it comes to Autohome Inc, we decided to create the market and define the rules of the market. So, when the market matures, we can be the biggest benefit
	Motivation	Goals	You need to enter before this (market) explosion and accumulate your strength.
	Intrinsic EA	Receptive processing	First, we will look at a lot of data…More importantly, I would dive into the market…Data gives you reference, but what really matters is to visit the shops.
EN02 - Event 2: over half of the employees left due to bad management	Intrinsic EA	Association generation, Mental simulation	I stupidly attribute these failures to my team. ...Now in retrospect, most of the problems are mine. This rough management style led to many people leaving and morale was low.

	Intrinsic EA	Threats detected	...no idea of how to manage the firm when half of the team left.
	Phasic EA	Information searching and scanning	There is no way to run the company, what should I do? If I were not so optimistic, I would have closed the company down and walked away. We were so anxious and the next day the throats were so sore we could hardly talk....
	Phasic EA	Resource mobilization, Testing and evaluation	Then we recruited from online friendly users, come here and we can train you. Then after one month, we found the problem is almost gone…My only thought was: I will survive this no matter what.
	Schemata	Validation	By nature, you are reluctant to acknowledge your own mistakes. But gradually you need to learn better ways to do things, to turn problems into more positive things. These things can improve...But now you gradually learn to discover these issues on time. Because if you crush your team, you can't get what you want. What you want is to move forward and fix the problem. So how to let your teams accept the existence of problems and not lose heart needs better communication.
EN02 - Event 3: how to work out goals and visions	Motivation	Goals	…the reason is, previously, there was a light tower before me, then we passed this light tower and there are no new ones, ahead. Now this is challenging for my team, especially for me. Because you need to find a new light tower. Further, the challenge and future fulfillment must exceed what the previous ones brought to us.
	Motivation	Value	Our vision is to serve the customers well.
EN02 - Event 4: talking about business decisions of building electric cars	Motivation	Goals	No matter if you are an investor or a manager, you need to reposition yourself. The time of fast development and countless dividend has passed...You should be professional in a comprehensive system, and a short plank may flunk you.

	Intrinsic EA	Receptive processing, Association generation, Mental simulation	The first step is cognition….You must learn the trend in the industry…We must learn the development of cars and the development of intelligence….You need to talk with many experts and professionals, and read a lot to learn this….Then you need to develop your own cognition structure, through constant learning and listening.
	Intrinsic EA	Association generation, Mental simulation	What is the most important problem for electric cars?...Two problems. First, higher car price due to batteries…. Second issue is inconveniences of charging…..Then the requirements to you have changed. You need to have the capacity to develop the whole system.
	Intrinsic EA	Receptive processing, Mental simulation	After short videos emerged, many things changed. Users' time and behavior have changed. Way of transactions have changed…
	Intrinsic EA	Mental simulation	Today, we all use dealers to sell, right? Why do we still use dealers to sell? If we do not use dealers, direct sales will have problems. What are those problems? The problems do not lie in the products but in cash flow.....This is how we look at things and I will next show how we find direction to march forward.
	Intrinsic EA	Mental simulation Third-person opportunities	What is our consumer profile? parents who also have grandparents at home to help them with taking care of kids.....Then you know your cars need to have three rows of seats....This demand have long since been ignored....Cause Americans and Europeans don't have their grandparents to take care of kids, which explains why they design the cars in ways like, you can only sit on the second row after folding the first row.....Also the trunk whether you can put the baby stroller in...
EN02 - Event 5: how he worked out the business plan for Li Auto	Motivation	Goals	the first five years of Li auto, we only have one goal: positive cash flow. We must learn to create blood for ourselves in the difficult industry, rather than relying on external investment... What is the goal for our development phase? Our goal is by 2025, we can get 20% of new energy car in China
	Motivation	Value	Your willingness is your determination in order to realize your goal.....Willingness is the first step, it solves the issue of action. Nobody lacks solutions, the most important thing is willingness.

	Intrinsic EA	Receptive processing, Association generation, Mental simulation	There are too many times that you lack self-observation... If you can't find problems, you will be lost. Since you cannot always rely on others, you have to learn self-observation.....
EN02 -Event 6: talking about venturing experience	Motivation	Goals	As the top person in the firm, you need to do a lot of work to make people see, so they can believe in you.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation	My personal growth comes from three aspects: firstly, regular reading is very important. Moreover, reading should cover more areas, not limited to automobile or technology. Secondly, friends around you who you always converse with and discuss the latest things. Third, my employees.
	Intrinsic EA triggering phasic EA	Third-person opportunities detected – Aha! moment	I think from the perspective of the users' value - whether you are addressing a long-term user value issue. I think the core criteria for smart driving is the replacement percentage of human driving…If people are using 80% or even 60% of the time in automatic driving, then it is time....
EN03 - Event 1: how he set up 3W coffee	Intrinsic EA	Receptive processing, Association generation, Mental simulation	Then I found that people who came here have information asymmetry….. For example, an entrepreneur in heavy-duty internet products was troubled because he could not find investors.
	Intrinsic EA triggering phasic EA	Third-person opportunities detected- – Aha! moment	this reminds me: Why can 3W coffee not be the port that serves as the platform between investors and entrepreneurs?
EN04 - Event 1: the decision of joining Hero entertainment	Motivation	Value	As long as you are ambitious and as long as you are willing to do this, I think there is really an opportunity.
	Intrinsic EA triggering phasic EA	Third-person opportunities detected – Aha! moment	What I value most is that he (Ying Shuling) is a righteous person. You don't have to worry whether you can walk long and afar with partners like him.
	Phasic EA	Information searching and scanning,	That is, whether we start a business or not. What are his advantages and what are his weaknesses? Supposing that we start a business. How to resolve his weaknesses.

	Phasic EA	Information searching and scanning, Resource mobilization	Shall we be the early birds? The answer is definitely yes. I was born to make a big deal... the key point is money...Based on our advantage, we think that why not try to be the global leading game developer and content creators?
EN04 - Event 2: talking about entrepreneurship	Motivation	Value	That moment struck me, and I decided from then on that I will be an entrepreneur.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation	At that moment, I found that if you are doing things you love, you could not help but be diligent...Enjoyment comes from emotions and inspirations, but interests keep you motivated and engaged in long-term thinking and accumulation
	Phasic EA	Resource mobilization	We are impacted by people around us. By keeping ambitious people around yourself, not only you can progress, but other people will also push you to progress
	Schemata	Validation	So being the first mover is very important. How to be the first one? You need to have in-depth thinking and understanding about things.
EN04 - Event 3: investment in Dark Myth Wukong	Motivation	Goals	It is very simple: world-level quality made in China. Based on our domestic game developing level, we do have a chance to reach world-level quality. The road will be long, and this is our goal.
	Motivation	Goals	For me, I believe that to aid the subculture merging into the mainstream is our responsibility
	Intrinsic EA	Receptive processing, Association generation, Mental simulation Third-person opportunities	The last generation of games are more MMO games, there are many firms focusing on mobile games, but very few of them focus on enhancing their quality. The conflicts between enhancing production technique and commercialization can be logically fixed but for a long period of time, it had been very difficult to enhance process and technique. Now there are ways to work out plausible solutions.

	Phasic EA	Information searching and scanning, Resource mobilization	So for investment, you should always first look at the team (of the project). If you develop games by your own firm, direction would be the most important element. Besides team...I also care about scarcity. Like the case of Dark myth.
	Schemata	Validation	For the past two years, Hero Entertainment has grown quickly in game development. This is also closely related to our investment. We had the chance to access the most productive forces in the industry.
EN05 - Event 1: deciding to make documentaries that record normal people's lives	Motivation	Value	Because we both love documentaries and both are interested in recording normal people's lives, we hit it off immediately and started this project as a part time right away.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation	Traditionally, the interview show is considered exclusively reserved for celebrities. Examples are "Shi San Yao" by Xu Zhiyuan, and "talking to strangers" by Tencent. You seldom see high-quality interviews with normal people. But the market has the demand. Young people love to be expressive; they are more aware of themselves and pay more attention to themselves and people like them. They are more courageous in voicing different opinions.
	Intrinsic EA triggering phasic EA	Third-person opportunities detected – Aha! moment	We consider interviewing normal people a blue ocean. There are no strong competitors around.
	Phasic EA	Information scanning and searching	We believe we can gain internet traffic. With enough traffic, we can earn money. That is why we made up our mind to produce programs that record young people's lives in the dialogue form.
EN05 - Event 2: how they improve when making documentaries	Motivation	Goals	We paid more attention to regular people’s lives and we hoped to record these people in our times. That is the origin of our program.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation	In the beginning, what we wanted to express was not clear to us. We just had a rough direction. After interviewing more and more people, we have a deepened understanding of our program.
EN06 - Event 1: how he started the business	Motivation	Value	My entrepreneurship choice seems not to play by the rules compared to those who have stable jobs, go abroad to study, or try to be public servants.

	Intrinsic EA	Receptive processing, Association generation, Mental simulation	But if I use my self-made camera to take a 360 degree video, people think it is cool, I also think it is cool and many kudos it. I have a great sense of fulfillment. To be honest, I just try to act cool. If we act cool in different ways, that is diversity.
	Phasic EA	Resource mobilization, Testing and evaluation	IDG gave us money so we can start to make 360 cameras, without which we do not even dare to think about making stuff like that. Because it is so ahead of time, without money we cannot deliver the hardware.
EN06 - Event 2: entrepreneurial decisions on what product to make and promote	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	We accidentally learned about 360-degree video shooting and picture taking. The pictures and videos produced are quite stunning. I think this form is very good, which helps people to record and share their lives. But at that time, it was very difficult to make pictures and videos like this. Normally users need to buy many cameras and make them a circle. After shooting, the processing required the use of computers, and it was very complicated. That is to say, only professionals can do that.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	So, we thought if we can provide consumers with a portable camera with an integrated solution, there is market potential for this. So, we started to do this since 2014.
	Phasic EA	Information searching and scanning	we first try to find these users; they suffer certain problems in certain situations...And the real enemy is the problem that users have when they encounter in situational use…
	Phasic EA	Resource mobilization	our products can effectively solve these problems. Then, we will setup the project to proceed.
	Phasic EA	Testing and evaluation	The adverse point is that nobody has tested the water for you. It is a riskier business. This is a product that is full of uncertainty and risk.
EN06 - Event 3: talking about entrepreneurial experiences	Motivation	Value	Then I thought, I am that genius! (laugh) It was at that time I got the idea of entrepreneurship
	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	I was using Uku to watch videos at that time and I found a problem: users have to watch a 1-minute commercial before they can watch the video unless they pay for membership to skip that.

	Phasic EA	Resource mobilization, Testing and evaluation	User experience is bad, so we developed a technology to move the commercial to the end of the video.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	Before we engaged in panorama VR, I partnered with the other founders of our current firms, who were from the software school of Nanjing University, and developed a live-streaming app. The reason is that there are many activities at our university, but many students could not participate in many activities due to various reasons. Then I accidentally saw a panorama video shot by a Russian. The video was then edited by the computer using complicated sewing software. That video was awesome.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	Then we were thinking about whether it was possible to develop a product that with one press you can take 360-degree video and photos. That is how we started our own version of a 360-degree camera.
	Motivation	Goals	When we first started the venture, we only thought as long as we could survive, we would be ok. Now we have not only solved the survival issue but are also thinking about how to make a better living.
EN06 - Event 4: talking about uncertainties of running a venture firm	Intrinsic EA	Receptive processing, Association generation, Mental simulation	The greatest difficulty is the type of problem that you only realize its existence after big consequences have already happened. You can never predict it, you can only learn it when bad things happen....For instance, not every product can be a success. You can only learn this after the product is launched on the market. Then you realize that some designs or other things are wrong. Therefore, you cannot rely on your reasoning to foresee such issues. This is the second type of difficulty that is unforeseeable and more difficult.
	Motivation	Value	Compared to those global top-notch firms, we think did not run fast enough and there are still places that we could have done better. Still our current status has far exceeded our original expectations…..Now we have survived more than 7 to 8 years, this also exceeded our original expectations.
	Motivation	Goals	An important precondition is interest. Because it is unlikely that you stick to a thing long enough if you are not interested.

EN06 - Event 5: how he evaluates risks and opportunities	Motivation	Value	To endure loneliness is very important… without interest, you cannot persist. Persistence is important.
	Motivation	Goals	interest motivates you to spend more time, and dig deeper in this area, which can turn into your competitive edge. Interest can also help you to pass through different cycles, such as phases when you hit rock bottom. Maybe that for some time, nobody acknowledges your vision. But when the market is ready, you have the right reservoir and are better equipped to move first.
	Schemata	Validation	let's think of it this way: if you fail this project, then the failure rate for the next project is smaller. If you fail again, the failure rate for the following project will be even smaller. For entrepreneurs, experiences and lessons are passed down to the next phase. If I returned to five, four, or three years ago, I would feel that I at that time was really dumb. In other words, if I did return to three, four, five years ago, I can do a much better job. So, this is an accumulation process.
	Phasic EA	Testing and evaluation	It is like playing cards. You cannot make sure that you will win this round. You can only understand partial reality, not the full picture. You just judge that you may win at a possibility, you cannot say for sure that you will win. Therefore, the most important thing is that when you play cards, do not go "all in", do not bet on all that you have. That is why I feel full evaluation of the risk is also important. Entrepreneurship is as long as you can walk ahead persistently, your experience, your capability, your thought, and your resources, etc., accumulate along the way. All of this will enhance the chance of success in the next phase.
	Phasic EA	Resource mobilization	Whenever you desire to start a venture you can do it. The thing that makes the difference is whether you have the necessary means at hand to realize that.
	Motivation	Need	(when being asked what made him decide to go aboard in 2015?) It was actually fear-driven.
EN06 - Event 6: talking about the process of exploring overseas market	Intrinsic EA	Receptive processing, Threats detected	At that time, domestic (consumer electronics) were playing a low-price strategy.

	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	There are objective advantages. Our category is relatively simple when we go abroad, and in the early days we mainly rely on online sales, so if we sell air conditioners it is certainly not that easy. What we do is a tool, so the requirements in terms of local cultural adaptation are not so high.
EN06 - Event 7: talks about the rationale of keeping innovating and how it is done	Intrinsic EA	Association generation, Mental simulation	The threshold of technology is a threshold, but the time of the threshold will not be particularly long. Two generations without epoch-making products, then you are reduced to a mediocre brand. Consumer electronics is never a one-trick pony, it needs to keep attacking.
	Intrinsic EA	Receptive processing	We do a lot of research and interviews. And we look at customer complaints, which are customer (feedback) questions. When you ask a customer what you need, the answer is likely biased, but you ask him what he's currently dissatisfied with, and that can be very specific, very tangible, and sometimes very effective.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	Early on, a lot of designs itself that merely followed intuition is not reliable. Your cognition has not reached that level…That's why you have to bring in more professional people. Someone with experience can bring a lot of readily available knowledge. You can derive some solutions from scenarios user needs, and technical solutions through some of your own methods, but these are not the same as the whole picture of things. So, keep trying to make mistakes and iterate.
EN06 - Event 8: the launch of panorama cameras	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	At that time, Samsung and Ricoh had already launched panoramic cameras. But those products connected the camera and the phone together through WiFi. The panoramic camera back then had N kinds of problems, but one of the things we experienced most was that it was not fast enough...Back in 2014 2015, no matter whether you use a digital camera or a cell phone, the experience of taking pictures was willing to start sharing immediately after shooting, so we felt that this pain point needed to be solved.

	Phasic EA	Information searching and scanning, Resource mobilization	Therefore, we thought of making a physical connection between the camera and the cell phone, that is, plugging the camera into the cell phone interface, plug and play, the camera is responsible for the acquisition, and transmission of one frame after the acquisition, and the cell phone software renders and decodes at the same time so that acquisition, transmission, and decoding can happen at the same time so that we can take pictures immediately.
EN06 - Event 9: how to overcome difficulties in expanding global presence of their panorama cameras	Intrinsic EA	Threats detected	then we found out that the sales were slow, and the mood was like riding a roller coaster.
	Phasic EA	Testing and evaluation	...through content. Let (potential) users really see how shocking the content shot by our camera is. Naturally, they will be interested in our panoramic cameras.
	Phasic EA	Resource mobilization	We are now using sports cameras to buy time for us to solve these fundamental problems. Of course, this is not the end game, and we will eventually do a comprehensive layout from upstream to downstream around how to record life better.
EN07 - Event 1: talks about entrepreneurial motivations	Motivation	Value	I treat entrepreneurship as my hobby, similar to playing games. My biggest passion is running this company. It is like playing real time strategic games or PK games today. I treat it as hobby then I won't be worn out.
	Phasic EA	Resource mobilization, Testing and evaluation	If you have a really good team, even if you are wrong one time, you still have chances to start over. The best approach is to be clear about your direction, team, and make sure the money is in place, then you think it over and over whether you really want to do it.
EN08 - Event 1: talks about his entrepreneurial decisions	Motivation	Value	It is not external acknowledgement or monetary value that drives me. Rather, it the story and what you want in your life that matters.
	Motivation	Goal	It is like in the past we talked about love and bread, sometimes you have to choose 1 from 2. This is definitely what you need to choose at the beginning of your entrepreneurship and the pursuit of your dreams.

	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	For people in this generation, modern people, very few people are willing to sit down and listen to other people's stories and difficulties. So, in the end, we are not giving advice or recommendations, but feeding back to them about what WE experienced and felt. Because most people do not pay attention to your story, what people want to do is just give you THEIR advice.
	Phasic EA	Testing and evaluation	I would like to create an environment that at our times, everybody can listen carefully what other people's stories. From these stories, people may find a shadow of themselves.
EN08 - Event 2: talks about his decision of opening a bar			
	Phasic EA	Testing and evaluation	for me the answer is simple: because I feel I am not just directing a film, but my own life. Only through more practice and experience can I create better, touching stories that are more authentic.
	Phasic EA	Resource mobilization	When we were close to the actual rollout of my plan, I was very anxious, because we could not find a professional to join us. Then a miracle happened. His name is Kero, a figure that every big bar in Taiwan and the Chinese mainland fights for...So in 2017, I made films, he made alcohol, and we together delivered the project "The Bar", which is now almost the perfect bar in Taipei.
EN08 - Event 3: the decision to run his business using blockchain concept	Motivation	Goals	Besides the bar, I have always wondered whether there are any technologies that can help extend and expand our plan
	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	in 2016, I watched a documentary called "Banking on Bitcoin." Then I realized what I used to consider as a hoax - bitcoin and the technology behind it- the blockchain, is the utopia of technology that I have always been thinking about. It is a chance that combines online and offline and a core technology that can bring entertainment industry forward.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	It took me two and a half years to finish the script and plan of this movie. The script and plan require too much knowledge on technology, and I have run into a lot of difficulties...All these people are my cherished helpers in my life. They all helped to nail down each and everything.

EN08 - Event 4: how he worked out his way of realizing his entrepreneurial vision	Motivation	Goals	So, I thought if I want to be a director in the future, can I figure out a way to ensure that I can just do that in the long run.
	Intrinsic EA	Association generation, Mental simulation, Third-person opportunities	Right now, in Taiwan, we do not have that environment…. I produced a film before graduation and used crowdfunding. Then I found that using crowdfunding may bring different ways of production and status. So, in the future, if you have one thousand to ten thousand loyal supporters, your business can go on forever.
	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	Now the question is, how can you find your loyal followers and persuade them to go along together? This is the first question I thought about. A second issue I thought about is that during this process, I need to have a business that can make money and develop together. How to synthesize all these stuff? After some long thinking, I finally produced a ten-year plan...now I have already proved that my thoughts are plausible, I have my products, I have my stories, I have my ways, so I can use a different way to finance my movie. Then I used blockchain to finance. It is actually a different form of crowdfunding.
EN09 – Event 1: the journey from quitting the stable job in banking and starting the venture	Motivation	Value	I realized that having more money does not make you happier. It is not the way to experience life. This made me decide to leave. I realized…it's very hard to really let the business succeed, when you have no true passion for the business, or when the passion was for the wrong thing.
	Intrinsic EA	Association generation, Mental simulation, Third-person opportunities	In due time, we realized that for business to succeed, (it) needs to be something that consumers didn't care much about price. What is lacking in custom apparel is that you really need to make customers feel happy so that they pay a premium, but we just didn't get there…But when we moved to e-commerce, we saw a need for logistics. We were a bit frustrated with Singapore where the very core tenets of e-commerce variety, transparency, and immediacy which a lot of companies neglected.

	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	From there, we are like, why don't you start something, like let's have a van and ship some goods. I'm sure we can solve the algorithm and supply chain problems. Toying with that idea for a bit, I went for dinner with my friend once… she said, let's give you a couple of hundred thousand, just go do it… we accepted the money, and we figured it out.
	Phasic EA	Testing and evaluation	In the earlier days of ninja van, I think we were toying the idea let's do a bit of deliveries, and logistics is a simple space, and building up some simple algorithms in the system, and in six months you'll be done… it's been two years we are still in deep shit, still building things everyday.
EN09 – Event 02: talking about the company's early development	Motivation	Value	The visions remain rather similar: getting parcels in the hands of consumers anywhere anytime in the most efficient manner possible.
	Motivation	Goal	But I think that journey towards that became a lot longer than we ever expected. we saw a lot more what the market is, went a lot deeper, a lot broader, and realized that there are just so many areas you need to improve.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation	…the company's scales become less nimble, things move a bit slower: when the ship leaves the harbor, it's much harder to get it back into the harbor. So, you think a lot more carefully before you say let's go through this, and it's just a whole new experience altogether again really… never had a clear vision, never a clear word map. The general vision stays the same, just gets sharper every day.
	Phasic EA	Resource mobilization	When we promise something, we do or die to get it done. If it means no sleeping overnight, that is how we should we get done.
EN09 – Event 03: solving the parcel sorting algorithm issue	Intrinsic EA	Mental simulation	we were running a process physically. We had two hundred parcels. So, we were trying to figure out, how the hell are we going to scale? – the 200 parcels took me two hours, 400 parcels it's not four hours, it's more than that.
	Intrinsic EA triggering phasic EA	Threats detected – creative jolt	How am I ever going to sort a thousand? … We just can't seem to figure that up.

	Phasic EA	Information searching and scanning, Testing and evaluation	We set ourselves to start thinking, we start searching. And you know, how else can we improve the process. Thankfully we managed to solve it.
EN09 – Event 04: talking about how he started the business four years later	Intrinsic EA	Receptive processing, Association generation, Mental simulation	Every time we had an online customer, we went 'wow, that's really easy to get a customer, no shop, nothing required. But the pain only hit after that when we had to deliver the parcel…I think the entire logistics industry was just not set up for e-commerce at that point in time.
	Intrinsic EA triggering Phasic EA	Third-person opportunities detected – Aha! moment	Why don't we open a logistics company to solve this problem?
	Phasic EA	Testing and evaluation	Weeks later, Chang Wen and his two co-founders Boxian Tan and Shaun Chong were up and running, leaving behind stable jobs in finance and engineering to expand their men's fashion business, Marcella, and take on deliveries.
EN09 – Event 05: talking about how they gave up clothing business and focused on logistics	Intrinsic EA	Receptive processing, Association generation, Mental simulation	But the more we did it, the more we realized that fashion business wasn't necessarily our forte: if we were to be a very neutral, agnostic provider of logistics services, ideally you should be neutral.
	Intrinsic EA triggering phasic EA	Third-person opportunities detected – Aha! moment	We decided let's focus on a business which we felt could scale a lot better, and not just in Singapore, but across the region.
	Phasic EA	Resource mobilization	So, the entrepreneurs pivoted again, shuttering their fashion line and investing their savings to go all in on their delivery service, which unlike traditional delivery providers, leverages heavily on technology.
EN10 – Event 01: How they started the venture	Motivation	Value	National University of Singapore, we have this coop program that sent us to Silicon Valley for one year to be an intern in a technology startup. And that was that one year where you know you're just so immersed in technology. Everywhere you go people are coding and talking about startups and I think that really opened my eyes to how technology had this opportunity to solve problems, meaningful problems at a very large scale and that really piqued my interests and my co-founders' interests. That changed our lives.
	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	Eventually we learned how to build an app solving our own problems. So, we have all these old gadgets that we were not using anymore. We joined a hackathon to build that app and turns out …hundreds of people wanted it after we pitched it after 54 hours.

	Phasic EA	Information searching and scanning, Resource mobilization, Testing and evaluation	That gave us the confidence to make our parents very angry and do this full-time… I guess the other part of it is funding right so one is the support of your parents which obviously you didn't get initially, but what about the support of the investment community how hard was it to raise money?
	Phasic EA	Resource mobilization	We had no salaries we were not funded it was just us in our laptops building the first version of carousel. So, funding at that time was not available. I think more importantly for us was to build a product that resonates with people, so we are focused on that…Eventually we were extremely lucky to have partnered with real world-class investors.
EN10 – Event 02: talking about customer complaints	Motivation	Value	How we stay focused…one of the things that we do is we're very anchored by our mission statement… to inspire every person in the world to start selling and buying.
	Intrinsic EA	Receptive processing	Wherever you go people are telling you about the problems and complaints. We really appreciate suggestions.
	Phasic EA	Information searching and scanning, Testing and evaluation	…I think that helps us get more and more data points on where we can improve, and I think that's fundamental to building a great product and service that's enduring
EN10 – Event 03: talking about learning from others and learning from your own mistakes	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	(From) some of these events and speakers you could learn a bunch of things and we've learned a lot from all these speakers…. You learn so much from interacting with your customers and your users, you know best. At some point, it's much better for you to take the next step to shape the next product future
	Phasic EA	Information searching and scanning, Testing and evaluation	Learn very quickly, iterate, and you know, take every error advice as data points.
EN10 – Event 04: talking about entrepreneurship and business running	Intrinsic EA	Receptive processing, Association generation, Mental simulation, Third-person opportunities	I think the mindset is first and foremost important that you have a customer technology that evolves, market evolves, customer behavior evolves. Be obsessive about them… think about how you can solve their problems and offer much better experience for them
	Phasic EA	Information searching and scanning	The second thing I think is really being laser focused on what you set out to do and why you set up to do what you do in the first place.

EN11 – Event 01: talking about entrepreneurship and business running	Motivation	Value	Was the journey hard? The journey was fun. Challenges are fun. Pain is pleasure.
	Intrinsic EA	Receptive processing, Association generation,	I believe that mindset is everything… If you are facing any unique problem, even if you are fresh out of college, you can solve the problem as well as someone who has been doing it for 20 years. Probably better than the person who's doing it for 20 years as you don't come with baggage. It's about how you unlearn and bring freshness.
	Triggering phasic EA	Threats detected – creative jolt	Swiggy once raised a billion dollars. We had nothing in our bank at that time.
	Phasic EA	Resource mobilization, Testing and evaluation	We sold our UAE business. We got 170 million dollars from there. We kept fighting. Kept working hard.
EN11 – Event 02: talking about how to evaluate their own product	Intrinsic EA	Receptive processing, Threats detected	As a product person, I watch my emotions in a way. If I can do my work seamlessly and calmly. That's a very good thing. Without having to think. If the app irritates me, I get irritated. That's when I know it is not right.
	Phasic EA	Resource mobilization	We've created a product feedback group on slack where we add these issues.
EN11 – Event 03: talking about would he start over if he is left with minimum resources	Intrinsic EA	Receptive processing	start something new…(Host: What new would you like to start?) I don't know. (Host: You'll take time off to learn.) -Yeah. (Host: How'd you learn?) Wander…wander mentally…I'd read. Reading is my thing…random books…you never know when it will be useful…More the information you download into your brain, you're able to use it sometime.
EN11 – Event 04: about perpetual learning and learning from mistakes	Motivation	Value	(Host: what are the things that you enjoy doing what are the things that you actually spend time on, and you still love showing up every day?) culture is the operating system of an organization and then product here I love product and…that's my thing.
	Intrinsic EA	Receptive processing	because if you seek comfort, then you don't seek learning correctly so that's the whole point of this. we want people who want to perpetually continue to learn