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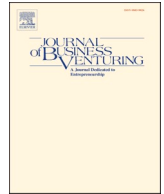
Now is the time: The effects of linguistic time reference and national time orientation on innovative new ventures

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ABSTRACT

Two perspectives stand out in examining international variations in innovative new venture creation: institutions and national culture. However, systematic insights into the interconnections between institutional and cultural perspectives and their effects on entrepreneurship are severely lacking. In order to fill this gap, the current research integrates two prominent yet under-explored institutional and cultural factors: linguistic future-time reference (FTR) as an institutional factor and long-term orientation as a cultural factor, and considers how they are linked through the time perspective reflected in risk and uncertainty perception. Drawing upon linguistic relativity theory and cultural theory, we propose that institutions with strong FTR languages and cultures with short-term orientation are more likely to foster innovative new venture creation. We utilized merged, multi-level, and multi-source data of 34,673 entrepreneurs from 42 countries to test our hypotheses. We also conducted a series of scenario-based, intra-group experiments with bilingual entrepreneurs to further confirm that strong-FTR has a positive relationship with innovative new venture creation. Results offer compelling support for our hypotheses.

"If you are depressed, you are living in the past.
If you are anxious, you are living in the future.
You are at peace, you are living in the present."

Lao Tzu

1. Executive summary

Understanding differences in innovative new venture creation across nations is a central focus in entrepreneurship research

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because compared with imitative ventures, innovative ventures tend to be more productive (Baumol, 1990) and create more employment opportunities for national economic development (Sobel, 2008; Stenholm et al., 2013). In examining these variations, two perspectives stand out: institutions, and national cultural values (Terjesen et al., 2016). Although a nation's institutional profile is closely associated with that nation's culture (Ahlstrom and Bruton, 2002; Busenitz et al., 2000), these two approaches have remained largely disconnected. Previous research has called to advance theory by exploring the interconnections between the institutional and cultural perspectives and the extent to which these are related to innovative new venture creation (Ahlstrom and Bruton, 2002; Cullen et al., 2014; Li and Zahra, 2012).

Creating an innovative new venture entails bringing forth novelty which necessitates behaviors under conditions of uncertainty (McMullen and Shepherd, 2006). Defined as "conditions where outcomes and probabilities cannot be estimated a priori" (Young et al., 2018), uncertainty represents a cornerstone of entrepreneurship (McMullen and Shepherd, 2006). In addition, new venture creation has been accounted for as a chain of intertwined events that evolves over time-sensitive processes (McMullen and Dimov, 2013). Thus, time, either the objective "clock" time or subjective experience of time (Shipp and Jansen, 2021), is essential for the entrepreneurial action of new venture creation (Wood et al., 2021). However, entrepreneurship research has largely failed to consider the time perspective as critical for firms navigating uncertainty (Wood et al., 2021). Time perspective refers to "cognitive processes partitioning human experiences into past, present, and future temporal frames" (Zimbardo and Boyd, 1999). Individuals, firms, and nations differ in their perspectives on time. Although dedicated research on time and entrepreneurship has been slowly emerging (Lévesque and Stephan, 2020), extant limited research has primarily focused on individual time perspectives and generally overlooked temporal considerations pertaining to institutions or culture as key determinants of cross-country variations in new venture creation.

In order to address these issues, we explore the underlying mechanisms of international variation in new venture creation with respect to time. In order to do so, we focus on two salient and interrelated aspects of time at the national level: linguistic time reference as an institutional factor and time orientation as a cultural value factor. We explore how they relate through the time perspective inherent in entrepreneurial uncertainty. We further illustrate how factoring in time within institutional and cultural perspectives can open new lines of inquiry for research on cross-national variations in the creation of innovative new ventures.

Although a growing body of research has examined various institutional factors that influence entrepreneurship (Bruton et al., 2010; Busenitz et al., 2000; McMullen et al., 2008), the effect of linguistics, as an institutional factor (Chi et al., 2020; Drori et al., 2018; Hechavarría et al., 2018; Terjesen et al., 2016), remains hidden and overlooked. An emerging literature has investigated the effects of language, i.e., *the function and usage of words in business communications,* on entrepreneurship (e.g., Anglin et al., 2018; Moss et al., 2018; Parhankangas and Renko, 2017). However, there is a dearth of research on the nexus between linguistic structures, i.e., *a form and facet of the dominant language that entrepreneurs speak*, and entrepreneurship (Drori et al., 2018; Hechavarría et al., 2018). The impact and potency of language structures on individuals' cognition, action, reality construction, and decision-making are relatively stable over time (Chen, 2013; Dahl and Velupillai, 2011; Danziger and Ward, 2010; Slobin, 2003; Thieroff, 2000). Language structures are specifically germane to new venture creation according to the "citation is prior to intention" claim (Derrida, 1979) and performativity theory which suggests that words create actions (Gond et al., 2016). If linguistic structures that speakers conform to constitute *citation* and establishment of new rules and practices brought forth by creating an innovative new venture constitutes *intention,* it has been argued that linguistic structures precede new venture creation (Drori et al., 2018). Although limited, existing evidence suggests that linguistic structures account for cross-national differences in labor market dynamics (Santacreu-Vasut et al., 2014) and female entrepreneurship (Drori et al., 2018; Hechavarría et al., 2018).

The linguistic structure of future-time reference (FTR) represents one of the most prominent and stable grammatical features of languages (Dahl, 2000; Thieroff, 2000). The FTR refers to when and how languages require speakers to grammatically mark the timing of events (Boroditsky, 2011; Dahl, 2000; Thieroff, 2000). It enables speakers to conceptualize the present and future with specific languages (Evans, 2013). As the FTR affects how individuals perceive the future, it makes time value an important reference frame for individuals' cognitions, decisions, and behaviors (Chen, 2013). By extension, we propose that the interface of FTR and the cross-national variations of innovative new ventures is inseparable. We theorize that institutions with strong-FTR languages are more likely to engender innovative new ventures.

By the same token, we focus on the temporal aspect of the national cultural values: long-term orientation (Hofstede, 2001). National culture refers to the collective programming of the human mind (Hofstede, 1980). Cultural values have been examined extensively in international management research (Venaik et al., 2013). Existing research on the effects of cultural values on entrepreneurship has largely drawn upon the original four dimensions of the seminal framework developed by Hofstede (1980): individualism, masculinity, power distance, and uncertainty avoidance (e.g., Autio et al., 2013; Kreiser et al., 2010; Li and Zahra, 2012; Mitchell et al., 2000; Sarooghi et al., 2015; Steensma et al., 2000; Taylor and Wilson, 2012). Later long- vs. short-term orientation was added as the fifth dimension of Hofstede's cultural framework (Hofstede, 1991). However, time orientation at the national level has been insufficiently explored in entrepreneurship (Lévesque and Stephan, 2020) with no existing research relating these differences to new venture creation. We propose that short-term oriented cultures are more likely to foster innovative new venture creation. We also explore the potential that institutions with strong-FTR languages promote innovative new ventures through their association with the national cultural value of short-term orientation.

The present research contributes to literatures by developing new theory and providing new empirical evidence on cross-national variations in new venture creation. As a critical component of informal institution, and a basic tool and core channel for individuals' cognitive information processing (Boroditsky, 2011), language structures directly determine individual decision-making under uncertain situations (Chen, 2013). However, since such institutional influence occurs below the surface of conscious collaborations, research emphasizing the role of formal institutions (e.g., government regulations) has missed this subtle effect. We shed new light on the nexus of institutions and entrepreneurship by shifting our attention to the hidden yet pervasive influence of an informal institution:

the linguistic structure of FTR.

In addition, national culture has been widely applied as a theoretical lens to understand the effects of cultural differences on economic growth and entrepreneurial activities. However, systematic insights into the interconnections between institutional and cultural perspectives and their effects on entrepreneurship are still lacking. The current research integrates two prominent yet under-explored institutional and cultural factors: linguistic FTR as an institutional factor and long-term orientation as a cultural factor. We examine how they are linked through the time perspective reflected in risk and uncertainty perception. By doing so, we provide an innovative approach to understanding entrepreneurship in different countries. Data collected from a multi-level, multi-source database with 34,673 entrepreneurs from 42 countries support our hypotheses. Experiments conducted in a replication study further enhance the support for the main hypothesis.

2. Theoretical background and hypothesis development

2.1. Institutions, linguistic structures, and the future-time-reference (FTR)

Institutional theory has been widely applied in international entrepreneurship research. Within this stream of research, the majority of studies draw upon North's (1994) categorization of formal (e.g., laws and regulations) and informal (e.g., norms of behavior) institutions. Other studies adopt Scott's (1995) three pillars of regulative (e.g., government policies, rules, and regulations), normative (e.g., social norms, values, and beliefs), and cognitive (e.g., shared knowledge and skills) institutions. A basic premise of this stream of research is that institutional arrangements are country-specific and unique in guiding national entrepreneurial activities (Casson, 1990) and innovation (Bartholomew, 1997).

Both institutional factors and cultural factors function as external facilitators and constraints in firm strategic decision-making, and have been suggested to account for cross-national differences in firm behavior (Graafland and Noorderhaven, 2020). In examining cross-national differences in entrepreneurial activities, research has focused on both institutions and culture as predictors of entrepreneurship (Cullen et al., 2014). For example, recent research found that institutions promoting stability led to more imitative ventures whereas institutions promoting flexibility led to more innovative new ventures (Young et al., 2018). Research on cultural influences found that national innovation rate was closely associated with the cultural values of uncertainty acceptance (Shane, 1993) and individualism (Taylor and Wilson, 2012).

Compared with a nation's predominant culture, institutions are more observable manifestations of the societal values (Kreiser et al., 2010; Scott, 1995). Previous research posits that institutional dimensions are distinct from the construct of culture both conceptually and empirically (Busenitz et al., 2000; Kostova, 1997). As a collectively-held values system (Hofstede, 1980), culture is a broad and generalized concept utilized to conceptualize national environments. Institutional characteristics, on the other hand, are issue-specific and domain-specific, and therefore are adopted to evaluate a specific phenomenon and to provide a more precise description of national environments (Kostova, 1997). In addition, national culture is widely considered to be endogenous to the nation's society and thus not susceptible to change (Hofstede, 1980). Therefore, measures of national cultural values can be time invariant (Hofstede, 1980). Institutions, on the other hand, can be quickly changed (Scott, 1995) as they evolve to solve social problems. Among Scott's (1995) three pillars of institutional dimensions, regulatory institutions can be shaped by government policies and regulations, and thus are more likely to change. Normative and cognitive institutions are more closely linked with the national culture (Busenitz et al., 2000), and thus are less likely to change. In this regard, entrepreneurs can more effectively shape their institutional environments and proactively build new rules for their industries (Ahlstrom and Bruton, 2002).

As an informal institutional factor, language is domain-specific (e.g., entrepreneurial activities) (Drori et al., 2018). For instance, linguistic structures that require speakers to grammatically mark the timing of events may embody inherited values and attitudes that dominate the social environments. These inherited values and attitudes, in turn, may affect the capability of institutional arrangements to enhance an environment that is munificent to innovative new venture creation. Notably, this institutional effect is more stable than other institutional factors, yet tends to be overlooked because language is entrenched in society so much that it is often taken for granted and because it affects individual and organizational behavior at a subconscious level (Drori et al., 2018). Since formal institutions (e.g., political regulations) change frequently, their influence is secondary to the influence of linguistic regime which is more pervasive and persistent (Hechavarría et al., 2018).

In the current research, we focus on the most salient, time-sensitive aspect of language structures: the future-time reference from typological linguistics. We draw upon insights of linguistic relativity theory which posits that language structure plays a distinct role in coding individuals' experience and influencing speakers' decisions (Sapir, 1921; Whorf, 1956). By affecting how speakers conceptualize the external environment, language structure determines interpretation and processing of external information, which in turn profoundly shapes individuals' cognitive processes (Boroditsky, 2011; Kay and Kempton, 1984; Whorf, 1956) and guides individuals' thinking (Lucy, 1997). As such, individuals can subconsciously "reflect elements" of their environment as they develop speaking, writing, and thinking skills in accordance with respective linguistic structures.

In addition, research in linguistics suggests that through shaping abstract concepts such as time and spatial situations, language structure not only enables individuals to access and process external information, but also allows information accessing and processing to be subtly influenced by temporal and spatial situations, which further influences individuals' cognition and judgement (Bylund and Athanasopoulos, 2017; Flecken et al., 2015; Flecken et al., 2014). More specifically, research indicates that different language structures lead to different spatial characteristics and temporal motion event perceptions of individuals (Wolff and Holmes, 2011). For example, English speakers predominantly talk about time as if it were horizontal, that is, the words used to order events are the same words used to describe horizontal spatial relations (Boroditsky, 2001). In the context of opportunity recognition, English speakers

would say: "the window of opportunity is *behind* us" or "new profitable opportunities are *ahead* of us." Mandarin Speakers, on the contrary, tend to use both horizontal and vertical spatial morphemes to discuss time (Boroditsky, 2001). For example, Mandarin uses *qian* (front) and *hou* (back), as well as *shang* (up) and *xia* (down) to describe the order of events, with earlier events referred to as *shang* (up) and later events as *xia* (down). Although vertical spatial metaphors are also used in English (e.g., "hand *down* entrepreneurial knowledge from generation to generation"), they are not used as commonly or systematically as the use of *shang* and *xia* in Mandarin (Boroditsky, 2001; Scott, 1989). Further, these spatiotemporal differences exert a great influence on how people perceive time. For example, time may be perceived to arrive faster by Mandarin speakers when they construct a vertical timeline (Boroditsky, 2001). As a result, Mandarin speakers may be better prepared (e.g., saving more) for the future.

The future-time reference (FTR) divides languages into two broad categories: futured and futureless languages (Dahl, 2000), or strong- and weak-FTR languages (Chen, 2013) in a more neutral manner. Futured languages require speakers to distinguish between present and future (e.g., English, Spanish, and Russian) through strict tense structure and mandatory verbs. In contrast, futureless languages do not require speakers to distinguish between present and future (e.g., Mandarin and German), and hold that there is no difference between present and future (Bittner, 2005; Chen, 2013; Dahl and Velupillai, 2011). In order to clearly present this distinction, we take an example from the World Atlas of Language Structures Online (Dryer and Haspelmath, 2013) to predict tomorrow's weather. A speaker with strong-FTR languages such as English, would say: "It will be cloudy tomorrow" or "It is going to be cloudy tomorrow." Grammatically, it will be wrong to use the present tense "is" to describe the weather tomorrow because English requires speakers to use a future marker such as "will" or "is going to" to describe future events. A speaker with weak-FTR languages such as Mandarin Chinese, in contrast, would say: "Mingtian yintian," which literally translates to "Tomorrow is cloudy." As there is no tense in Mandarin Chinese, Chinese does not require speakers to distinguish between present and future events.

Empirically, research on the effect of FTR on individual behaviors has shown that weak-FTR speakers save more, retire with more wealth, and pay more attention to their health (Chen, 2013; Roberts et al., 2015). Speakers with weak-FTR languages are also found to be more supportive of initiatives to protect the environment (Pérez and Tavits, 2017). Related research in organizational studies provides evidence that companies with a strong-FTR language as their official language exhibit less corporate social responsibility (CSR) and R&D behaviors (Liang et al., 2018). In addition, firms with weak-FTR languages are found to have higher precautionary cash holdings (Chen et al., 2017), less accrual-based earnings management and less real earnings management (Kim et al., 2017). At the national level, countries with weak-FTR languages are found to be positively associated with country-level R&D investment (Chi et al., 2020).

2.2. FTR and innovative new ventures

Entrepreneurial ventures are scattered on a continuum from imitation to innovation (e.g., Baumol, 1990; Eckhardt and Shane, 2003; McMullen et al., 2008; Samuelsson and Davidsson, 2009; Tang et al., 2012). Innovative entrepreneurial ventures achieve value creation through introducing new "means-ends" frameworks to create new products, services, technologies, and processes (Eckhardt and Shane, 2003). The utter novelty of new product and service offerings affords competitive advantages for the new ventures. A multitude of research has examined the drivers of innovative new ventures from a range of perspectives. One school of thought emphasizes founders and their characteristics such as prior knowledge (Shane, 2000), entrepreneurial alertness (Levasseur et al., 2020; Tang et al., 2021a), positive affect (Baron and Tang, 2011), social capital (Samuelsson and Davidsson, 2009), information seeking behavior (Dyer et al., 2008), and information diversity (Hull et al., 2020), among others.

Uncertainty and risk inherent in innovative ventures is higher than that in imitative ventures (Samuelsson and Davidsson, 2009; Shane and Venkataraman, 2000) because by nature, with "untried practices," innovative new ventures convey disruptions to the market and industry, which may rearrange the demand and supply conditions (Schumpeter, 1928). Building our arguments on the linguistic relativity theory and on the premise that the uncertainty and risk tolerance inherent in speaking distinctively about future events influences individuals' future-related behaviors (Chen, 2013; Dahl, 2000; Liang et al., 2018; Thieroff, 2000), we theorize that institutions with strong-FTR languages are more likely to foster innovative new ventures.

We propose that the FTR can affect new venture creation through the cognitive mechanism of *time perception* (Chen, 2013; Roberts et al., 2015). *Time perception* refers to the extent to which FTR influences individuals' future choices by changing how they feel about future events (Chen, 2013). Institutions with weak-FTR speak about the present and future identically. This vague marking of future time would make future events less conspicuous and lead to less precise belief about the timing of future events (Chen, 2013). As institutions with weak-FTR languages use the present tense to describe future events, individuals in such institutions tend to feel that future events are happening now, and thus perceive future events to be closer to the present. If future is perceived to be more vivid and to arrive more rapidly, people will be more concerned about the uncertainty of the future and engage in more risk-averse behaviors accordingly (Chen, 2013). By extension, with respect to new venture creation, individuals in weak-FTR institutions would perceive higher uncertainty about the future event of innovative new venture creation, which will further lead to more risk-averse behaviors. Hence, weak-FTR institutions would promote more imitative new ventures associated with more accessible information, less uncertainty, and less risk (McMullen et al., 2008).

Conversely, institutions with strong-FTR mark the future tense as different from the present tense. It prompts individuals to perceive a strict distinction between the present and future (Dahl, 2000; Thieroff, 2000) and thus leads to more precise mental and psychological partitioning of time (Roberts et al., 2015). This occurs because grammatical time marking is encoded in memory and requires increased attention to time (Chen, 2013). If future events are distant from the current reality, uncertainty in the future will be discounted and risk-seeking behavior will be enhanced (Roberts et al., 2015). By extension, strong-FTR institutions would encourage people to embrace the uncertainty and to take risks with innovative ventures in the future. These arguments are aligned with the large

volume of evidence in entrepreneurship research that innovative firms tend to have higher risk-taking propensity (e.g., Lumpkin and Dess, 1996). On the basis of the rationales and evidence above, we propose that:

Hypothesis 1.   Institutions with strong-FTR languages are more likely to foster innovative new ventures.

2.3. Culture, national time orientation, and innovative new ventures

Culture is "the software of the mind" that determines people's perceptions, and cultural values represent societal needs and demands (Hofstede, 1991). The temporal consideration among the national cultural values is referred to as long-term vs. short-term orientation (Hofstede, 2001). Although extant research has linked cultural values to international variation in entrepreneurship (e. g., Autio et al., 2013; Cullen et al., 2014; Hayton et al., 2002), to the best of our knowledge, no existing research has explored the effect of the national cultural value of short-term vs. long-term orientation on cross-national variations in entrepreneurship (Lévesque and Stephan, 2020).

Originally referred to as Confucian dynamism, time orientation at the societal level refers to the extent to which a society presents a future-oriented perspective or a short-term point of view (Hofstede, 2001). It distinguishes between countries in which the emphasis is on the past or present, and countries that focus attention on the future (Hofstede, 2001). Extant research suggests that long-term orientation matters at the individual, organizational, and national levels, and has received more scholarly attention than short-term orientation. For example, at the individual level, entrepreneurs with a perceived future-time perspective are more alert to new business opportunities (Tang et al., 2021b). At the firm level, long-term orientation tends to be associated with family firms and contributes to competitive advantages in family firms (Lumpkin and Brigham, 2011). At the societal level, long-term orientation has been found to be associated with cross-country differences in environmental protection, credit rating, and innovation (Wang et al., 2016). National long-term orientation has also been linked to national economic prosperity and support for competitiveness (Ashkanasy et al., 2004; Hofstede and Minkov, 2010).

Acknowledging this robust research on long-term orientation, we echo the burgeoning call for more attention on short-term orientation because a present time perspective promises a powerful source of meaningfulness for new venture creation (Lévesque and Stephan, 2020). Although long-term orientation may be supportive of growth-oriented businesses, new firms entail coming to grips with present realities and face critical crisis points and time pressures (Tang et al., 2021b), which requires present-thinking and a focus adequately grounded in present time realities (Le Breton-Miller and Miller, 2011). Creating innovative new ventures is more costly and risky, and sometimes requires quick decisions without careful considerations about long-term benefits (Lumpkin and Brigham, 2011), making it challenging for new firms to prioritize long-term goals such as financial security or socioemotional wealth.

A short-term orientation is associated with risk-taking behaviors which are embedded more deeply in innovative new venture creation than in imitative ventures (Samuelsson and Davidsson, 2009; Shane and Venkataraman, 2000). Short-term oriented cultures encourage individuals to deal with a broader array of circumstances because the limited concern for risk enables individuals to welcome uncertainty and change, which allows them to develop the psychological resources critical for adjusting to "untried practices." Moreover, creating new "means-ends frameworks" with unknowns does not intimidate individuals with short-term oriented cultures because such cultures prompt individuals to enjoy pushing their learning into new frontiers. Another characteristic of short-term orientation that is particularly relevant to innovative new venture creation is that individuals in short-term orientated cultures are more readily to adopt new products and to see quick outcomes in order to enhance their societal status (Yalcinkaya, 2008). When under pressures of quick-changing customer demands and fast obsolescence of new products, new ventures in short-oriented cultures are prompted to focus on delivering new products within a short amount of time (Tian et al., 2018). Therefore, Tian et al. (2018) suggested that a short-term orientation may have a positive influence on national innovation rate.

Prior research suggests that cultural values are inextricably associated with affect that further motivates behavior (Schwartz, 2007). For example, individuals within short-term oriented cultures focus on "seizing the day" and are generally happier and more enthusiastic with life (Zimbardo and Boyd, 1999). Such positive emotions allow individuals to perceive fewer risks (Foo, 2011), broaden individuals' thought-action repertoires (Fredrickson, 2001), and enhance creativity and innovation (Baron and Tang, 2011). Accordingly, these positive emotions are aligned with the characteristics of the environment that fosters innovation: flexible and open (Baron and Tang, 2011).

As mentioned above, empirical investigation into the short-term time perspective at the national level and entrepreneurship is severely lacking. Lažnjak (2011) found that countries with combined cultural values of higher individualism, lower uncertainty avoidance, smaller power distance, and short-term orientation encourage higher innovation. In exploring the influence of long-term orientation distance on selections of joint ventures, Kaufmann and O'Neill (2007) found that long-term orientation distance has a negative effect on selections of innovation-focused joint ventures. Consistent with our theorizing, prior research found that new ventures are more likely to invest in short-term initiatives as they seek short-term results (Wang and Bansal, 2012). Based on the rationale and logics above, we propose:

Hypothesis 2.   The national cultural value of short-term orientation is more likely to foster innovative new ventures than long-term orientation.

As mentioned earlier, the majority of research on cross-national variations in entrepreneurship has primarily focused on either institutional or cultural factors in isolation. Research investigating the potential effects of institutions intertwined with cultural values on entrepreneurship remains underdeveloped (Cullen et al., 2014). However, institutions are closely connected to the dominant cultural value systems (Hofstede, 2001) and people's perceptions of how things should be done (Autio et al., 2013). The

interconnections between institutions and culture account for the persistent and stable influence of institutions (Ahlstrom and Bruton, 2002). Institutions and cultures are intricately interwoven in affecting various entrepreneurial activities such as venture capital investment (Li and Zahra, 2012), foreign market entry (Henisz, 2000), opportunity entrepreneurship (Cullen et al., 2014), and innovation (Shane, 1993). Thus, prior research has suggested that integrating institutional and cultural perspectives represents a promising research direction (Ahlstrom and Bruton, 2002; Cullen et al., 2014; Graafland and Noorderhaven, 2020; Li and Zahra, 2012). Further, such integration could help account for the inconsistent findings of the role of culture in entrepreneurship (Bruton et al., 2010).

Nevertheless, the absence of an overarching perspective to help integrate institutions and culture has stifled the body of work recognizing the importance of doing so (Cullen et al., 2014). To address this void, we recognize the consistency in the time perspective inherent in institutions with weak-FTR (strong-FTR) and cultures with long-term orientation (short-term orientation), and we propose that they are positively associated. Specifically, long-term orientation stresses planning for and investing in the future, and emphasizes willingness to delay gratifications in order to achieve long-term goals (Hofstede, 2001). Thus, long-term oriented cultures foster such behaviors as perseverance and thrift (Hofstede, 2001). These behaviors are congruent with the future-oriented behaviors associated with institutions with weak-FTR speakers such as saving more, retiring with more wealth, smoking less, and practicing safer sex (Chen, 2013).

In contrast, short-term orientation focuses on what is happening now and on immediate returns on the time, energy, and efforts invested (Hofstede, 2001). Hence, short-term oriented cultures prefer tasks that bring rewards in the short run (Hofstede, 2001). Strong-FTR speakers are found to be less concerned for the future, and exhibit less future-oriented behaviors such as saving less over time and paying inadequate attention to their health (Chen, 2013). Companies with a strong-FTR language as their official language also exhibit less future-oriented behaviors such as CSR and R&D (Liang et al., 2018). Overall, the values, beliefs, behavioral habits, and cognitive tendencies shaped by the strong-FTR are highly similar to those of short-term oriented cultures. We thus propose that institutions with strong-FTR languages are positively associated with cultures of short-term orientation.

Prior research suggests that institutions may influence entrepreneurship through their impact on cultural values and attitudes (Terjesen et al., 2016). Adopting this perspective, and combining the logics and hypotheses above, we propose that institutions with strong-FTR languages foster innovative new ventures through their positive connections with the national cultural value of short-term orientation. As posited by linguistic relativity theory, language learning which is started during early childhood takes a relatively long period of time (several years) to finish (Sapir, 1921; Whorf, 1956). In this process, individuals are trained, from childhood onward, to use specific forms of expression that guide conceptualization and thinking (Lucy, 1997). This language learning process thus persistently impacts individuals' adult life and profoundly shapes individual cognition and behavior in many aspects (Sapir, 1921; Whorf, 1956). Being subtle, this institutional effect may occur at a subconscious level, and be overlooked because language is entrenched in society so much that it is often taken for granted (Drori et al., 2018). Cultural values, on the other hand, represent societal needs and demands (Hofstede, 1991), and are more likely to exert a broad, generalized influence on individuals in their adult life. Therefore, the effect of linguistic structures should precede the effect of cultural values. That is, the influence of cultural values is secondary to the influence of linguistic structures because linguistic effect starts in an individual's early childhood and is more pervasive and persistent.

Taken together, we propose a potential mechanism through which the strong-FTR affects innovative new venture creation – short-term orientation. By doing so, we advance a more comprehensive framework for an integrated examination of how institutional factors and cultural factors are inextricably related through the consistent time perspective inherent in these factors.

Hypothesis 3.   Institutions with strong-FTR languages foster innovative new ventures through their positive associations with national cultures of short-term orientation.

3. Main study: hypothesis testing with multisource data

3.1. Sample and data collection

Data were drawn from the Global Entrepreneurship Monitor (GEM), the KOF Globalization Index, the Worldwide Governance Indicators (WGI), the World Bank Database (WBD), the Eidgenössische Technische Hochschule (ETH), and the United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Report. All individual-level data were obtained from the GEM and country-level data from the others. As the largest ongoing research consortium collecting individual- and national-level data on the incidence, determinants, and outcomes of entrepreneurial activities, GEM conducts survey data collection annually in participating countries and generates strictly harmonized cross-national databases with micro-level data on entrepreneurial attitudes, activities, and aspirations. This dataset forms a unique and distinctive set of internationally comparative data on national-level entrepreneurial activity (e.g., Boudreaux et al., 2019; Kwon and Arenius, 2010; Young et al., 2018). We matched the individual-level data with country-level data.

Following previous research (Boudreaux et al., 2019; Kwon and Arenius, 2010; Young et al., 2018) and consistent with our research probing the effects of language structures on innovative new ventures, we included individuals identified in the GEM data as being "involved in early-stage entrepreneurial activity" (Reynolds and Hechavarría, 2015: 2). This criterion allowed us to minimize survivorship bias (Cassar, 2010) by focusing on nascent entrepreneurs still in the planning stages and those who had just started pursuing an entrepreneurial venture during the year GEM was conducted. Our final sample included 34,673 observations across 42 countries during the period of 2005–2015.

3.2. Measures

3.2.1. Innovative new ventures

Consistent with previous research that innovation in new ventures is a multifaceted phenomenon (Eckhardt and Shane, 2003; Samuelsson and Davidsson, 2009; Sobel, 2008), we adopted Young et al.'s (2018) three-item, formative measure to capture the type of new ventures created. All items were directly taken from the GEM Adult Population Survey (APS). (1) "Do all, some, or none of your potential customers think this product or service new and unfamiliar?" ("0" = "none," "1" = "few," "2" = "many"). This item represented a demand-side indicator of how innovative the new venture was. (2) "Right now, are there many, few, or no businesses offering the same products or services to your potential customers?" ("0" = "many," "1" = "few," "2" = "no"). This item captured the presence or absence of competitors. (3) "Have the technologies or procedures required for this product or service been available for less than one year, or between 1 and 5 years, or longer than 5 years?" ("0" = "more than 5 years," "1" = "1–5 years," "2" = "less than a year"). Items 2 and 3 represented supply-side indicators of how innovative the new venture was. We added the values of these three indicators to create a composite measure of innovative new ventures so that larger values represented more innovative new ventures.

3.2.2. Future-time-reference

In order to measure the future-time reference of the official language in entrepreneurs' home country, we followed Chen's (2013) classification which was developed based on the European Science Foundation's Typology of Languages in Europe (EUROTYP). Strong-FTR languages include a set of languages that require marking future-time when making predictions, and were coded as "1." Weak-FTR languages do not require obligatory use of future time reference in prediction-based contexts, and were coded as "0."

We consulted with World Values Survey, Wikipedia, and UNESCO World Report to determine the official language in each entrepreneur's country. In our final sample, five countries/regions recognize two official languages. Among these, both official languages in Canada (English and French), Philippines (English and Tagalog), and India (English and Hindi) denote strong-FTR, and were coded as strong-FTR accordingly. The official languages in the other two countries/regions, Singapore (English and Cantonese) and Hong Kong (English and Cantonese), represent different future time references. In these cases, we followed Drori et al. (2018) to identify the dominant language. In order to do so, we compared World Values Survey, Wikipedia, and UNESCO World Report along with a large number of tourism brochures in each country to select the language spoken by the largest population as the dominant language (English for Singapore and Cantonese for Hong Kong). In our robustness test, we removed these five countries and reran the analysis. Results were largely identical to the results with the full data.

Following Chen (2013) and Liang et al. (2018), we included two alternative variables to measure FTR in order to confirm the validity of the FTR classifications via EUROTYP. Developed by Chen (2013), both of these variables were scraped from a large number of websites for full-sentence weather forecasts in 39 different languages. Both variables capture how frequently a language grammatically marks future time and further categorize these 39 languages into strong- and weak-FTR languages. (1) "Verb ratio" counts the total number of verbs that are future-marked grammatically, divided by the total number of future-referring verbs. (2) "Sentence ratio" calculates the share of sentences regarding future weather that includes a grammatical future marker. Both of these variables are continuous variables on a scale of 0–100 with higher values indicating stronger-FTR.

3.2.3. Short-term orientation

Short-term orientation, reversed from the long-term orientation, was measured with Hofstede's National Culture Index (Hofstede, 2001). Hofstede's cultural values have been employed extensively in international business and entrepreneurship research (Kreiser et al., 2010). Our data showed that the values for short-term orientation ranged from 0.1 to 75.4. Higher values indicated shorter-oriented cultures.

3.2.4. Control variables

We included control variables both at the individual- and country- level. At the individual level, entrepreneurs' *age*, *gender* ("1" = "male" and "0" = "female") and *education* ("0" = "primary school or lower," "1" = "middle school," "2" = "high school," "3" = "undergraduate," "4" = "graduate or above") were included because they not only influence individuals' cognitive thinking but their ability to acquire external resources (Marvel and Lumpkin, 2007). Entrepreneurs' connections with other entrepreneurs not only enhance their access to crucial information, language, and skills, but also enlarge their linking to other stakeholders (Boudreaux et al., 2019). Thus, we followed Boudreaux et al. (2019) and utilized the item from GEM to control entrepreneurs' *social capital* ("1" = if the entrepreneur knows someone that has devised a business in the past two years, "0" = otherwise). *Fear of failure* ("1" = "afraid of failure" and "0" = "not afraid of failure"), *family income*, and *self-efficacy* were controlled because previous research indicated that they may be highly associated with innovative new ventures (e.g., Autio et al., 2013). Family income was measured with the following item: "Which level do you think your family income belongs to?" ("1" = "the bottom 33%," "2" = "the middle 33%," "3" = "the highest 33%"). Self-efficacy was measured with the following item: "Do you have the knowledge, skills and experience needed to start a new venture?" ("1" = "yes," "0" = "no"). All these individual-level control variables were obtained from the GEM.

We controlled several country-level variables due to their significant impact on innovation and entrepreneurship. *National GDP*, *GDP growth rate*, *unemployment rate*, *percentage of GDP on foreign direct investment (FDI)* and the amount of *patent applications*, were obtained from the World Bank data. *Formal institutions* were measured with the six dimensions obtained from the Worldwide Governance Indicators Database (Ault and Spicer, 2014): (1) political stability and absence of violence, (2) regulatory quality, (3) rule of law, (4) voice and accountability, (5) control of corruption, and (6) government effectiveness. *National culture* was controlled with Hofstede's National Culture Index (Hofstede, 2001): (1) power distance, (2) individualism and collectivism, (3) uncertainty avoidance,

Table 1

Means, standard deviations, and correlations (main study).

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1. Innovative new ventures	2.00	1.47												
2. Age	37.82	11.67	0.00											
3. Gender	0.64	0.48	0.00	0.00										
4. Family income	2.29	0.79	0.00	0.01	0.11									
5. Education	2.40	0.99	0.04	0.00	0.02	0.24								
6. Social capital	0.67	0.47	0.01	−0.06	0.06	0.11	0.10							
7. Self-efficacy	0.85	0.36	0.03	0.09	0.07	0.06	0.06	0.10						
8. Fear of Failure	0.26	0.44	−0.04	0.00	−0.06	−0.06	−0.02	−0.04	−0.16					
9. Power distance	58.49	17.37	0.03	−0.09	−0.05	0.02	−0.20	−0.03	−0.05	0.04				
10. Individualism and collectivism	42.67	25.19	−0.07	0.11	0.05	−0.05	0.19	0.04	0.05	−0.01	−0.74			
11. Masculinity and femininity	50.23	18.82	−0.05	0.00	−0.04	−0.03	−0.07	−0.04	−0.04	0.03	0.22	−0.14		
12. Uncertainty avoidance	68.75	23.06	0.08	−0.02	0.04	0.03	−0.09	−0.06	0.08	−0.02	0.15	−0.25	−0.04	
13. GDP	27.10	1.58	−0.06	0.08	0.00	−0.03	0.04	0.04	−0.02	−0.01	−0.03	0.32	0.42	−0.31
14. GDP growth rate	0.05	0.12	0.06	−0.05	−0.03	0.03	0.00	0.03	−0.02	−0.03	0.21	−0.26	0.07	−0.11
15. Number of patent applications	7.47	2.57	−0.08	0.07	0.02	−0.04	0.08	0.07	−0.04	0.01	−0.08	0.40	0.30	−0.41
16. Unemployment rate	8.67	5.04	0.02	0.00	0.04	0.04	0.03	−0.05	0.07	0.00	−0.11	0.07	−0.16	0.45
17. FDI	4.91	8.11	0.03	0.03	0.00	0.02	0.05	0.00	0.00	−0.03	−0.11	0.04	−0.16	−0.23
18. Political stability and absence of violence/terrorism	−0.03	0.93	−0.06	0.10	0.02	−0.03	0.17	0.05	0.01	0.00	−0.54	0.62	−0.38	−0.25
19. Regulatory quality	0.82	0.67	0.02	0.13	0.05	−0.01	0.21	0.00	0.04	−0.05	−0.67	0.61	−0.33	−0.11
20. Rule of law	0.64	0.88	0.01	0.14	0.05	−0.02	0.23	0.03	0.05	−0.04	−0.73	0.71	−0.40	−0.17
21. Voice and accountability	0.49	0.87	0.03	0.12	0.04	−0.03	0.16	−0.01	0.10	−0.05	−0.68	0.66	−0.37	0.25
22. Government efficiency	0.77	0.71	−0.02	0.13	0.04	−0.03	0.22	0.03	0.02	−0.04	−0.70	0.69	−0.35	−0.28
23. Control of corruption	0.62	0.93	0.02	0.13	0.04	−0.02	0.20	0.03	0.04	−0.05	−0.68	0.62	−0.42	−0.18
24. Linguistic diversity	0.27	0.22	−0.07	0.01	0.01	−0.04	0.07	0.04	−0.05	0.05	−0.12	0.32	−0.13	−0.55
25. Globalization	74.49	9.28	−0.03	0.12	0.06	−0.04	0.19	0.03	0.04	−0.01	−0.65	0.74	−0.37	−0.06
26. Future-time reference	0.80	0.40	0.09	0.00	−0.01	0.00	0.00	−0.10	0.06	0.03	0.20	−0.13	0.05	0.42
27. Short-term orientation	46.43	23.02	0.11	0.03	−0.04	0.00	−0.05	−0.09	0.10	−0.05	0.04	−0.19	0.15	0.37

	13	14	15	16	17	18	19	20	21	22	23	24	25	26
13. GDP														
14. GDP growth rate	−0.02													
15. Number of patent applications	0.92	0.00												
16. Unemployment rate	−0.08	−0.19	−0.15											
17. FDI	−0.14	0.08	−0.14	−0.10										
18. Political stability and absence of violence/terrorism	−0.04	−0.21	0.13	−0.09	0.24									
19. Regulatory quality	0.03	−0.28	0.05	0.06	0.30	0.69								
20. Rule of law	0.10	−0.27	0.17	0.08	0.25	0.82	0.93							
21. Voice and accountability	−0.12	−0.33	−0.14	0.26	0.12	0.66	0.81	0.83						
22. Government efficiency	0.18	−0.23	0.25	0.02	0.26	0.79	0.91	0.96	0.73					
23. Control of corruption	0.06	−0.19	0.13	0.00	0.30	0.81	0.90	0.97	0.79	0.94				
24. Linguistic diversity	0.16	−0.06	0.28	−0.04	0.04	0.17	0.06	0.16	−0.06	0.26	0.10			
25. Globalization	0.09	−0.38	0.19	0.21	0.20	0.79	0.83	0.90	0.79	0.87	0.83	0.24		
26. Future- time reference	−0.28	−0.08	−0.42	0.32	−0.08	−0.26	−0.08	−0.15	0.07	−0.21	−0.21	−0.19	−0.13	
27. Short-term orientation	−0.18	−0.01	−0.46	0.11	−0.05	−0.35	−0.05	−0.16	0.16	−0.21	−0.14	−0.47	−0.28	0.62

Note: Correlations (the absolute values) larger than 0.011 are significant at the level of 0.05. Two-tailed test.

Table 2

HLM regression analysis results (Main Study, $N = 34{,}673$).

Variables	Innovative new ventures						Short term orientation			Innovative new ventures					
	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Individual-level control variables															
Age[a]	−0.06*	0.03	0.029	−0.06*	0.03	0.031	0.00**	0.00	0.003	−0.06*	0.03	0.021	−0.06*	0.03	0.022
Gender	0.00	0.02	0.764	0.00	0.02	0.928	0.00	0.00	0.740	0.00	0.02	0.864	0.00	0.02	0.918
Family income	−0.07***	0.01	0.000	−0.06***	0.01	0.000	0.00	0.00	0.274	−0.06***	0.01	0.000	−0.06***	0.01	0.000
Education	0.09***	0.01	0.000	0.08***	0.01	0.000	0.00+	0.00	0.078	0.08***	0.01	0.000	0.08***	0.01	0.000
Social capital	0.06***	0.02	0.000	0.07***	0.02	0.000	0.00	0.00	0.124	0.06***	0.02	0.000	0.07***	0.02	0.000
Self-efficacy	0.06**	0.02	0.006	0.06*	0.02	0.011	0.01***	0.00	0.000	0.05*	0.02	0.029	0.05*	0.02	0.029
Fear of failure	−0.09***	0.02	0.000	−0.10***	0.02	0.000	0.00	0.00	0.303	−0.10***	0.02	0.000	−0.10***	0.02	0.000
Country-level control variables															
Power distance[a]	0.47***	0.04	0.000	0.30***	0.04	0.000	−0.14***	0.00	0.000	0.47***	0.04	0.000	0.40***	0.04	0.000
Individualism and collectivism[a]	0.00	0.04	0.976	−0.07+	0.04	0.097	−0.14***	0.00	0.000	0.07	0.04	0.099	0.03	0.04	0.515
Masculinity and femininity[a]	0.01	0.02	0.632	−0.05*	0.02	0.033	−0.01***	0.00	0.000	−0.02	0.02	0.293	−0.04+	0.02	0.061
Uncertainty avoidance[a]	0.11**	0.04	0.004	0.13**	0.04	0.001	−0.14***	0.00	0.000	0.24***	0.04	0.000	0.23***	0.04	0.000
GDP[a]	−0.15***	0.02	0.000	−0.09***	0.03	0.000	0.06***	0.00	0.000	−0.16***	0.02	0.000	−0.14***	0.03	0.000
GDP growth rate	0.41**	0.13	0.002	0.44**	0.13	0.001	−0.09***	0.01	0.000	0.51***	0.13	0.000	0.50***	0.13	0.000
Number of patent applications[a]	0.07***	0.02	0.000	0.07***	0.02	0.000	−0.03***	0.00	0.000	0.10***	0.02	0.000	0.10***	0.02	0.000
Unemployment rate	−0.02***	0.00	0.000	−0.02***	0.00	0.000	0.00***	0.00	0.000	−0.02***	0.00	0.000	−0.02***	0.00	0.000
FDI	0.01***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.01***	0.00	0.000	0.01***	0.00	0.000
Political stability and absence of violence/terrorism	−0.42***	0.03	0.000	−0.31***	0.03	0.000	−0.08***	0.00	0.000	−0.27***	0.03	0.000	−0.25***	0.03	0.000
Regulatory quality	−0.30***	0.05	0.000	−0.17**	0.05	0.001	−0.19***	0.00	0.000	−0.05	0.05	0.402	−0.03	0.05	0.546
Rule of law	0.73***	0.07	0.000	0.42***	0.08	0.000	−0.01*	0.00	0.021	0.53***	0.07	0.000	0.43***	0.08	0.000
Voice and accountability	0.08+	0.04	0.082	0.11**	0.04	0.010	0.22***	0.00	0.000	−0.08+	0.05	0.068	−0.04	0.05	0.380
Government efficiency	−0.07	0.06	0.245	−0.09	0.06	0.155	0.06***	0.00	0.000	−0.14*	0.06	0.026	−0.14*	0.06	0.030
Control of corruption	−0.13**	0.05	0.009	0.00	0.05	0.932	0.02***	0.00	0.000	−0.06	0.05	0.261	−0.01	0.05	0.771
Linguistic diversity	0.21**	0.07	0.002	0.28***	0.07	0.000	−0.15***	0.00	0.000	0.39***	0.07	0.000	0.39***	0.07	0.000
Globalization	0.02***	0.00	0.000	0.02***	0.00	0.000	0.00***	0.00	0.000	0.02***	0.00	0.000	0.02***	0.00	0.000
Independent and mediating effects															
Future time reference				0.29***	0.04	0.000	0.22***	0.00	0.000				0.12**	0.04	0.003
Short term orientation[a]										0.88***	0.08	0.000	0.74***	0.09	0.000
Cons	1.68*	0.66	0.011	1.35*	0.67	0.044	1.05***	0.08	0.000	0.62	0.67	0.355	0.64	0.67	0.338
Year fixed effect	Yes														
Observations	34,673														
Wald Chi[2]	1226.73***			1296.20***			72,849.75***			1349.23***			1358.65***		
LR test Vs. linear regression	194.63***			156.94***			6789.82***			157.79***			158.95***		

Note: B = unstandardized coefficients; SE = standard errors.

[a] Log transformed.

+ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

*** Significant at the 0.1% level.

and (4) masculinity and femininity. *Linguistic diversity* was controlled due to its potential to influence individuals' cognitive complexity associated with language structures (Dow et al., 2016). Obtained from the UNESCO World Report ("Investing in Cultural Diversity and Intercultural Dialogue"), Greenberg's (language) Diversity Index was used to measure linguistic diversity, i.e., the probability that two people selected from the population at random will have different mother tongues. Finally, following recent research (Liang et al., 2018), we controlled *globalization* level of the entrepreneurs' home country with the KOF Globalization Index published by the Eidgenossische Technische Hochschule (ETH). The KOF Index is the most widely used globalization index in scholarly and policy research. It measures the degree of globalization, integration and interdependence of a country in the economic, social, technological, cultural, political and ecological fields. The KOF scores range from 1 to 100 where higher scores indicate higher levels of the country's globalization.

3.3. Analysis and results

Table 1 summarizes the descriptive statistics for the Main Study. To reduce the threat of multicollinearity, we mean-centered all variables (Neter et al., 1985). Furthermore, we calculated the variance inflation factor (VIF) statistics and all VIF values were less than the threshold of 10. We utilized STATA 15 to conduct Hierarchical Linear Modeling (HLM) to test our hypotheses because HLM allows us to analyze variance in outcome variables when predictor variables occur at more than one level of the nested data structure (Young et al., 2018). We were able to model variables at both the individual- and country-level while controlling for the partial independence of individuals embedded in the same country (Kreft and De Leeuw, 1998).

We conducted a multi-level, mixed-effects Restricted Maximum Likelihood (ReML) regression model (also known as HLM) with fixed effects (Raudenbush and Bryk, 2002), that is, $\eta_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + r_{ij}$, where η_{ij} is the likelihood of innovative new ventures by individual i in country j; X_{ij} denotes the individual-level explanatory variables; β_{0j} is the intercept when X_{ij} is zero; β_{1j} is a vector of the estimated coefficients for X_{ij}; and r_{ij} is the random error (unique effect associated with individual i in country j). Level-2 can be represented mathematically as $\begin{cases} \beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j} \\ \beta_{1j} = \gamma_{10} + \gamma_{11}W_j + \mu_{1j} \end{cases}$, where W_j denotes the country-level explanatory variables; γ_{00}, γ_{10} are the intercepts; and μ_{0j}, μ_{1j} denote the random error.

Regression analysis results are presented in Table 2. Hypothesis 1 predicts that strong-FTR is positively associated with innovative new ventures. Model 2 in Table 2 indicated that strong-FTR has a positive and significant relationship with innovative new ventures (B = 0.29, *p* = .000), supporting H1. Hypothesis 2 predicts that short-term orientation is positively associated with innovative new ventures. Model 4 in Table 2 indicated that short-term orientation was positively related to innovative new ventures (B = 0.88, *p* = .000). Hypothesis 2 was thus supported. Hypothesis 3 proposes that strong-FTR fosters innovative new ventures through its positive association with short-term orientation. Studies investigating mediation analysis suggest that a multiplication of two normally distributed variables is not normally distributed, and that the distribution of the product tends to be asymmetric. As a result of this asymmetry, the statistical power of the Sobel test is lower compared to the methods that attempt to correct this asymmetry (MacKinnon et al., 1995; MacKinnon et al., 2002). In order to overcome this problem, bootstrapping is suggested because it is a non-parametric resampling method and differs from other mediation methods in that it does not require the normality assumption of sampling distribution to test mediation (Preacher and Hayes, 2008; Shrout and Bolger, 2002). Bootstrapping is a computationally intensive technique, which involves multiple data resampling processes and estimation of the indirect effect in each resampled data set. By repeating this process thousands of times, an empirical approximation is used to estimate the confidence intervals of the indirect effect.

Following Preacher and Hayes (2008), we estimated the indirect effect of strong-FTR on innovative new ventures with SEM utilizing bootstrapping procedures with 5000 resamples to place 95% confidence intervals around the estimates of the mediating effects. Results showed that the indirect effect of strong-FTR on innovative new ventures through short-term orientation was significant and positive (estimate = 0.36, 95% CI = [0.05, 0.21]). Hypothesis 3 was also supported. A closer look at Table 2 reveals that the effect of strong-FTR remained significant when short-term orientation was added to the regression (Model 5 in Table 2), suggesting a partial
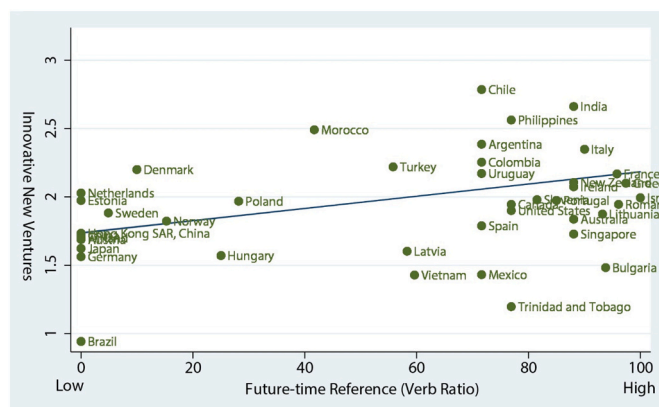

Fig. 1. The relationship between FTR and innovative new ventures.

mediation effect.

To facilitate visual interpretations of these significant effects, we plotted the relationship of FTR and innovative new ventures in Fig. 1 and the relationship of short-term orientation and innovative new ventures in Fig. 2. For Fig. 1, we used Verb Ratio to represent FTR because Verb Ratio is a continuous variable with higher values indicating stronger-FTR. These figures further indicated that countries with stronger-FTR and shorter-oriented cultures are more likely to foster innovative new ventures.

3.4. Robustness tests

In order to further ensure the robustness of the results reported above, we conducted a series of robustness tests. First, we used Propensity Score Matching (PSM) technique to run the analysis in order to assure the controlled effect and address potential self-selection or endogeneity bias. Following extant research (Abadie and Imbens, 2016; Feldman et al., 2016; Connelly et al., 2017), we employed PSM to match the treatment (strong-FTR) and control groups (weak-FTR) on observable attributes that are most likely to explain why one subject experiences the event while another does not. The estimation of the propensity score included Age, Gender, Family income, Education, Social capital, Self-efficacy, Fear of failure, Power distance, Individualism and collectivism, Masculinity and femininity, Uncertainty avoidance, GDP, GDP growth rate, Number of patent applications, and Unemployment rate. The algorithm we used identifies each individual's nearest neighbor with replacement, thus reducing estimation bias at the cost of higher variance. The covariate balance with PSM confirms that treatment and control groups became much more comparable after matching: the standardized differences in the matched sample approached zero, and the variance ratio approached one, satisfying the balancing condition. After constructing the treatment and control groups with PSM and confirming that these two groups are indeed comparable (our final sample size was reduced to 19,754), we reran the analyses for hypotheses testing. The results for Robustness Test 1, presented in Table 3, were largely identical to the study results reported in Table 2. We also used Coarsened Exact Matching technique to exactly match treated and controlled individuals, and the results remained virtually unchanged.

In addition, as presented earlier, we adopted two alternative measures for FTR: Verb Ratio and Sentence Ratio (Chen, 2013). We reran the analyses with these two alternative measures of FTR. Robustness Test 2 (with Verb Ratio as independent variable) and Robustness Test 3 (wit Sentence Ratio as independent variable) results are presented in Tables 4 and 5 respectively. These results were largely identical to the results reported in Table 2. Further, we calculated the effect size estimates for the magnitude of these findings. Results indicated that as verb ratio moved one standard deviation above the mean, the probability of starting innovative new ventures would increase by 6.61%, and that as sentence ratio changed one standard deviation above the mean, the probability of starting innovative new ventures would increase by 7.64%. Finally, as mentioned above, five countries/regions in our sample recognize two official languages (Canada, Philippines, Singapore, India, and Hong Kong), so we excluded these countries and reran the analysis with Robustness Test 4. These results, summarized in Table 6, were largely identical to the results reported earlier.

4. Replication study with laboratory experiments for Hypothesis 1

Linguistic research suggests that a promising way to identify the effects of linguistic structures is through experiments involving changes of languages with different structures (Mavisakalyan and Weber, 2018; Roberts et al., 2015). The exogenous change of languages could be manipulated in a controlled laboratory experimental setting with bilingual participants to explore the causal relationship (Sutter et al., 2018). Therefore, we conducted intra-group experiments with bilingual entrepreneurs (English and Mandarin) to replicate the results for Hypothesis 1 predicting the impact of FTR on innovative new ventures. We presented participants with imitative and innovative new venture scenarios in English and Mandarin and asked them to indicate which of these scenarios would represent their preferred start-up. This approach allowed us to manipulate the change of languages while controlling for the effects of other individual or environmental effects.

In addition, replications are vital for the external validity of experiments (Cook and Campbell, 1979), which highlights the
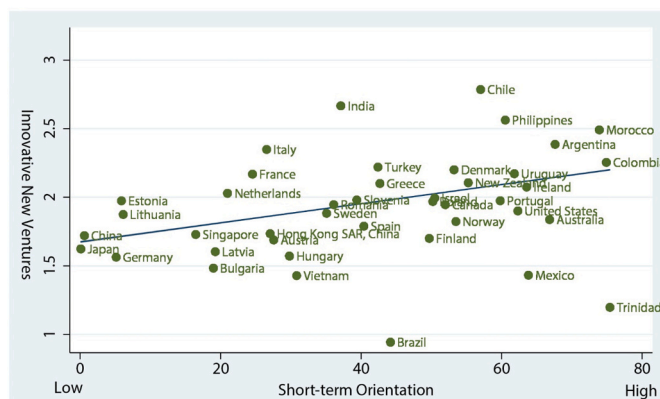

Fig. 2. The relationship between short-term orientation and innovative new ventures.

Table 3

Robustness test 1 results (Propensity-Score Matching Analysis Results, $N = 19,754$).

Variables	Innovative new ventures						Short term orientation			Innovative New ventures					
	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Individual-level control variables															
Age[a]	−0.02	0.03	0.549	−0.02	0.03	0.591	0.00[+]	0.00	0.084	−0.02	0.03	0.607	−0.02	0.03	0.612
Gender	−0.01	0.02	0.696	−0.01	0.02	0.631	0.00***	0.00	0.443	−0.01	0.02	0.638	−0.01	0.02	0.621
Family income	−0.03**	0.01	0.014	−0.03*	0.01	0.015	0.00***	0.00	0.000	−0.03**	0.01	0.010	−0.03*	0.01	0.011
Education	0.07***	0.01	0.000	0.06***	0.01	0.000	0.00***	0.00	0.000	0.07***	0.01	0.000	0.06***	0.01	0.000
Social capital	0.04[+]	0.02	0.078	0.04[+]	0.02	0.072	0.00**	0.00	0.008	0.04[+]	0.02	0.087	0.04[+]	0.02	0.081
Self-efficacy	0.02	0.03	0.468	0.02	0.03	0.520	0.00**	0.00	0.002	0.02	0.03	0.566	0.02	0.03	0.565
Fear of failure	−0.11***	0.02	0.000	−0.12***	0.02	0.000	0.00	0.00	0.876	−0.11***	0.02	0.000	−0.12***	0.02	0.000
Country-level control variables															
Power distance[a]	0.52***	0.06	0.000	0.41***	0.06	0.000	−0.22***	0.00	0.000	0.58***	0.06	0.000	0.50***	0.07	0.000
Individualism and collectivism[a]	−0.01	0.06	0.922	−0.03	0.06	0.592	−0.21***	0.00	0.000	0.10	0.06	0.106	0.05	0.07	0.418
Masculinity and femininity[a]	0.16***	0.04	0.000	0.11**	0.04	0.003	0.00[+]	0.00	0.087	0.13***	0.04	0.000	0.11***	0.04	0.003
Uncertainty avoidance[a]	0.28***	0.06	0.000	0.31***	0.06	0.000	−0.12***	0.00	0.000	0.37***	0.06	0.000	0.36***	0.06	0.000
GDP[a]	−0.16***	0.03	0.000	−0.11**	0.04	0.002	0.05***	0.00	0.000	−0.16***	0.03	0.000	−0.14***	0.04	0.000
GDP growth rate	0.34*	0.15	0.029	0.32*	0.15	0.040	−0.09***	0.01	0.000	0.38*	0.15	0.014	0.36*	0.16	0.022
Number of patent applications[a]	0.06**	0.02	0.005	0.06**	0.02	0.008	−0.02***	0.00	0.000	0.07**	0.02	0.001	0.07**	0.02	0.002
Unemployment rate	−0.01	0.01	0.297	−0.01[+]	0.01	0.062	0.00***	0.00	0.000	−0.01[+]	0.01	0.053	−0.01[+]	0.01	0.035
FDI	0.01***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.01***	0.00	0.000	0.01***	0.00	0.000
Political stability and absence of violence/terrorism	−0.45***	0.04	0.000	−0.35***	0.04	0.000	−0.09***	0.00	0.000	−0.33***	0.04	0.000	−0.31***	0.05	0.000
Regulatory quality	−0.52***	0.06	0.000	−0.39***	0.06	0.000	−0.15***	0.00	0.000	−0.34***	0.07	0.000	−0.33***	0.07	0.000
Rule of law	1.26***	0.10	0.000	1.01***	0.11	0.000	−0.03***	0.01	0.000	1.11***	0.11	0.000	1.02***	0.11	0.000
Voice and accountability	−0.14*	0.06	0.027	−0.11[+]	0.06	0.074	0.17***	0.00	0.000	−0.22***	0.06	0.000	−0.18**	0.07	0.006
Government efficiency	−0.13	0.09	0.136	−0.16[+]	0.09	0.067	−0.06***	0.00	0.000	−0.11	0.09	0.194	−0.14	0.09	0.125
Control of corruption	−0.27***	0.07	0.000	−0.15*	0.08	0.048	0.13***	0.00	0.000	−0.27***	0.07	0.000	−0.21**	0.08	0.009
Linguistic diversity	0.49***	0.11	0.000	0.55	0.11	0.000	−0.24***	0.01	0.000	0.68***	0.11	0.000	0.65***	0.12	0.000
Globalization	0.03***	0.00	0.000	0.02***	0.00	0.000	0.00***	0.00	0.000	0.03***	0.00	0.000	0.03***	0.00	0.000
Independent and mediating effects															
Future time reference				0.22***	0.05	0.000	0.23***	0.00	0.000				0.12*	0.06	0.034
Short term orientation[a]										0.62***	0.12	0.000	0.43**	0.15	0.004
Cons	−0.33	0.92	0.724	−0.72	0.93	0.435	1.69***	0.09	0.000	−1.53	0.95	0.108	−1.37	0.95	0.150
Year fixed effect	Yes														
Observations	19,754														
Wald Chi²	929.93***			954.39***			59,649.27***			958.42***			963.07***		
LR test Vs. linear regression	159.64***			108.60***			8504.15***			134.64***			114.90***		

B = unstandardized coefficients; SE = standard errors.

The indirect effect of strong-FTR on innovative new ventures was significant and positive (estimate = 0.17, 95% CI = [0.118, 0.217])

[a] Log transformed.

[+] Significant at the 10% level.

[*] Significant at the 5% level.

[**] Significant at the 1% level.

[***] Significant at the 0.1% level.

Table 4
Robustness test 2 results (FTR – verb ratio as independent variable, N = 34,673).

Variables	Innovative New Ventures						Short Term Orientation			Innovative New Ventures					
	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Individual-level control variables															
Age[a]	−0.06*	0.03	0.029	−0.06*	0.03	0.025	0.00+	0.00	0.069	−0.06*	0.03	0.021	−0.06*	0.03	0.021
Gender	0.00	0.02	0.764	0.00	0.02	0.992	0.00	0.00	0.121	0.00	0.02	0.864	0.00	0.02	0.963
Family income	−0.07***	0.01	0.000	−0.06***	0.01	0.000	0.00	0.00	0.947	−0.06***	0.01	0.000	−0.06***	0.01	0.000
Education	0.09***	0.01	0.000	0.08***	0.01	0.000	0.00***	0.00	0.000	0.08***	0.01	0.000	0.08***	0.01	0.000
Social capital	0.06***	0.02	0.000	0.07***	0.02	0.000	0.00*	0.00	0.059	0.06***	0.02	0.000	0.07***	0.02	0.000
Self-efficacy	0.06**	0.02	0.006	0.06*	0.02	0.010	0.01***	0.00	0.000	0.05*	0.02	0.029	0.05*	0.02	0.025
Fear of failure	−0.09***	0.02	0.000	−0.10***	0.02	0.000	0.00	0.00	0.384	−0.10***	0.02	0.000	−0.10***	0.02	0.000
Country-level control variables															
Power distance[a]	0.47***	0.04	0.000	0.32***	0.04	0.000	−0.12***	0.00	0.000	0.47***	0.04	0.000	0.40***	0.04	0.000
Individualism and collectivism[a]	0.00	0.04	0.976	−0.03	0.04	0.537	−0.11***	0.00	0.000	0.07	0.04	0.099	0.04	0.04	0.345
Masculinity and femininity[a]	0.01	0.02	0.632	−0.01	0.02	0.665	0.02***	0.00	0.000	−0.02	0.02	0.293	−0.03	0.02	0.255
Uncertainty avoidance[a]	0.11**	0.04	0.004	0.18***	0.04	0.000	−0.10***	0.00	0.000	0.24***	0.04	0.000	0.24***	0.04	0.000
GDP[a]	−0.15***	0.02	0.000	−0.11***	0.02	0.000	0.04***	0.00	0.000	−0.16***	0.02	0.000	−0.14***	0.03	0.000
GDP growth rate	0.41**	0.13	0.002	0.43**	0.13	0.001	−0.09***	0.01	0.000	0.51***	0.13	0.000	0.49***	0.13	0.000
Number of patent applications[a]	0.07***	0.02	0.000	0.08***	0.02	0.000	−0.03***	0.00	0.000	0.10***	0.02	0.000	0.10***	0.02	0.000
Unemployment rate	−0.02***	0.00	0.000	−0.02***	0.00	0.000	0.00***	0.00	0.000	−0.02***	0.00	0.000	−0.02***	0.00	0.000
FDI	0.01***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.01***	0.00	0.000	0.01	0.00	0.000
Political stability and absence of violence/terrorism	−0.42***	0.03	0.000	−0.29***	0.03	0.000	−0.07***	0.00	0.000	−0.27***	0.03	0.000	−0.25***	0.03	0.000
Regulatory quality	−0.30***	0.05	0.000	−0.14**	0.05	0.006	−0.17***	0.00	0.000	−0.05	0.05	0.402	−0.03	0.05	0.605
Rule of law	0.73***	0.07	0.000	0.41***	0.08	0.000	−0.01***	0.00	0.351	0.53***	0.07	0.000	0.42***	0.08	0.000
Voice and accountability	0.08+	0.04	0.082	0.07	0.04	0.103	0.18***	0.00	0.000	−0.08+	0.05	0.068	−0.05	0.05	0.307
Government efficiency	−0.07	0.06	0.245	−0.08	0.06	0.270	0.08***	0.00	0.000	−0.14*	0.06	0.026	−0.13+	0.06	0.053
Control of corruption	−0.13**	0.05	0.009	0.00	0.05	0.909	0.01***	0.00	0.000	−0.06	0.05	0.261	−0.01	0.05	0.820
Linguistic diversity	0.21**	0.07	0.002	0.29***	0.07	0.000	−0.14***	0.00	0.000	0.39***	0.07	0.000	0.38***	0.07	0.000
Globalization	0.02***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.02***	0.00	0.000	0.02***	0.00	0.000
Independent and mediating effects															
Future time reference				0.07***	0.01	0.000	0.06***	0.00	0.000				0.04***	0.01	0.000
Short term orientation[a]										0.88***	0.08	0.000	0.66***	0.10	0.000
Cons	1.68*	0.66	0.011	1.21+	0.67	0.071	0.95***	0.08	0.000	0.62	0.67	0.355	0.64	0.67	0.349
Year fixed effect	Yes														
Observations	34,673														
Wald Chi[2]	1226.73***			1320.11***			83,942.60***			1349.23***			1365.23***		
LR test Vs. linear regression	194.63***			166.16***			7512.78***			157.79***			162.46***		

B = unstandardized coefficients; SE = standard errors.

The indirect effect of strong-FTR on innovative new ventures was significant and positive (estimate = 0.0010, 95% CI = [0.0001, 0.0018]).

[a] Log transformed.

+ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

*** Significant at the 0.1% level.

Table 5
Robustness test 3 results (FTR – sentence ratio as independent variable, N = 34,673).

Variables	Innovative New Ventures						Short Term Orientation			Innovative New Ventures					
	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Individual-level control variables															
Age[a]	−0.06*	0.03	0.029	−0.06*	0.03	0.024	0.00	0.00	0.106	−0.06*	0.03	0.021	−0.06*	0.03	0.020
Gender	0.00	0.02	0.764	0.00	0.02	0.983	0.00[+]	0.00	0.071	0.00	0.02	0.864	0.00	0.02	0.966
Family income	−0.07***	0.01	0.000	−0.06***	0.01	0.000	0.00	0.00	0.750	−0.06***	0.01	0.000	−0.06***	0.01	0.000
Education	0.09***	0.01	0.000	0.08***	0.01	0.000	0.00***	0.00	0.000	0.08***	0.01	0.000	0.08***	0.01	0.000
Social capital	0.06***	0.02	0.000	0.07***	0.02	0.000	0.00*	0.00	0.032	0.06***	0.02	0.000	0.07***	0.02	0.000
Self-efficacy	0.06**	0.02	0.006	0.06**	0.02	0.010	0.01***	0.00	0.000	0.05*	0.02	0.029	0.05*	0.02	0.025
Fear of failure	−0.09***	0.02	0.000	−0.10***	0.02	0.000	0.00	0.00	0.409	−0.10***	0.02	0.000	−0.10***	0.02	0.000
Country-level control variables															
Power distance[a]	0.47***	0.04	0.000	0.32***	0.04	0.000	−0.12***	0.00	0.000	0.47***	0.04	0.000	0.40***	0.04	0.000
Individualism and collectivism[a]	0.00	0.04	0.976	−0.03	0.04	0.493	−0.11***	0.00	0.000	0.07	0.04	0.099	0.04	0.04	0.371
Masculinity and femininity[a]	0.01	0.02	0.632	−0.01	0.02	0.609	0.02***	0.00	0.000	−0.02	0.02	0.293	−0.03	0.02	0.245
Uncertainty avoidance[a]	0.11**	0.04	0.004	0.17***	0.04	0.000	−0.11***	0.00	0.000	0.24***	0.04	0.000	0.24***	0.04	0.000
GDP[a]	−0.15***	0.02	0.000	−0.11***	0.02	0.000	0.04***	0.00	0.000	−0.16***	0.02	0.000	−0.14***	0.03	0.000
GDP growth rate	0.41**	0.13	0.002	0.42**	0.13	0.001	−0.10***	0.01	0.000	0.51***	0.13	0.000	0.49***	0.13	0.000
Number of patent applications[a]	0.07***	0.02	0.000	0.08***	0.02	0.000	−0.03***	0.00	0.000	0.10***	0.02	0.000	0.10***	0.02	0.000
Unemployment rate	−0.02***	0.00	0.000	−0.02***	0.00	0.000	0.00***	0.00	0.000	−0.02***	0.00	0.000	−0.02***	0.00	0.000
FDI	0.01***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.01***	0.00	0.000	0.01***	0.00	0.000
Political stability and absence of violence/terrorism	−0.42***	0.03	0.000	−0.30***	0.03	0.000	−0.08***	0.00	0.000	−0.27***	0.03	0.000	−0.25***	0.03	0.000
Regulatory quality	−0.30***	0.05	0.000	−0.14**	0.05	0.008	−0.17***	0.00	0.000	−0.05	0.05	0.402	−0.03	0.05	0.599
Rule of law	0.73***	0.07	0.000	0.42***	0.08	0.000	0.00**	0.00	0.004	0.53***	0.07	0.000	0.42***	0.08	0.000
Voice and accountability	0.08[+]	0.04	0.082	0.07	0.04	0.099	0.18***	0.00	0.000	−0.08[+]	0.05	0.068	−0.05	0.05	0.327
Government efficiency	−0.07	0.06	0.245	−0.07	0.06	0.239	0.08***	0.00	0.000	−0.14*	0.06	0.026	−0.12[+]	0.06	0.050
Control of corruption	−0.13**	0.05	0.009	−0.01	0.05	0.951	0.01***	0.00	0.000	−0.06	0.05	0.261	−0.01	0.05	0.826
Linguistic diversity	0.21**	0.07	0.002	0.29***	0.07	0.000	−0.15***	0.00	0.000	0.39***	0.07	0.000	0.38***	0.07	0.000
Globalization	0.02***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.02***	0.00	0.000	0.02***	0.00	0.000
Independent and mediating effects															
Future time reference				0.08***	0.01	0.000	0.06***	0.00	0.000				0.04***	0.01	0.000
Short term orientation[a]										0.88***	0.08	0.000	0.66***	0.10	0.000
Cons	1.68*	0.66	0.011	1.21[+]	0.67	0.070	0.95***	0.08	0.000	0.62	0.67	0.355	0.63	0.67	0.338
Year fixed effect	Yes														
Observations	34,673														
Wald Chi^2	1226.73***			1318.15***			80,737.17***			1349.23***			1365.52***		
LR test Vs. Linear regression	194.63***			167.72***			7602.62***			157.79***			163.15***		

B = unstandardized coefficients; SE = standard errors.

The indirect effect of strong-FTR on innovative new ventures was significant and positive (estimate = 0.0012, 95% CI = [0.0004, 0.0020])

[a] Log transformed.

[+] Significant at the 10% level.

[*] Significant at the 5% level.

[**] Significant at the 1% level.

[***] Significant at the 0.1% level.

Table 6

Robustness test 4 results ($N = 32,419$ with cases from Canada, Singapore, Philippines, India and Hong Kong removed).

Variables	Innovative new ventures						Short term orientation			Innovative New ventures					
	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Individual-level control variables															
Age[a]	−0.06*	0.03	0.027	−0.06+	0.03	0.024	0.00	0.00	0.205	−0.06*	0.03	0.022	−0.06*	0.03	0.022
Gender	0.01	0.02	0.661	0.01	0.02	0.757	0.00***	0.00	0.000	0.00	0.02	0.876	0.00	0.02	0.828
Family income	−0.06***	0.01	0.000	−0.06***	0.01	0.000	0.00	0.00	0.145	−0.06***	0.01	0.000	−0.06***	0.01	0.000
Education	0.09***	0.01	0.000	0.09***	0.01	0.000	0.00	0.00	0.745	0.09***	0.01	0.000	0.09***	0.01	0.000
Social capital	0.05**	0.02	0.006	0.05**	0.02	0.003	0.00	0.00	0.243	0.05**	0.02	0.005	0.05**	0.02	0.003
Self-efficacy	0.06*	0.02	0.012	0.05*	0.02	0.031	0.00***	0.00	0.000	0.05*	0.02	0.029	0.05*	0.02	0.036
Fear of failure	−0.10***	0.02	0.000	−0.11***	0.02	0.000	0.00**	0.00	0.007	−0.11***	0.02	0.000	−0.11***	0.02	0.000
Country-level control variables															
Power distance[a]	0.27***	0.06	0.000	0.06	0.07	0.403	−0.24***	0.00	0.000	0.35***	0.06	0.000	0.13+	0.07	0.058
Individualism and collectivism[a]	−0.10*	0.04	0.019	−0.23***	0.04	0.000	−0.19***	0.00	0.000	−0.02	0.04	0.699	−0.17**	0.05	0.001
Masculinity and femininity[a]	0.00	0.03	0.939	−0.05+	0.03	0.078	−0.02***	0.00	0.000	−0.01	0.03	0.811	−0.04	0.03	0.132
Uncertainty avoidance[a]	0.17**	0.06	0.007	0.12+	0.06	0.056	−0.11***	0.00	0.000	0.24***	0.06	0.000	0.16**	0.06	0.012
GDP[a]	−0.18***	0.03	0.000	−0.11***	0.03	0.000	0.06***	0.00	0.000	−0.20***	0.03	0.000	−0.13***	0.03	0.000
GDP growth rate	0.52***	0.13	0.000	0.57***	0.13	0.000	−0.07***	0.01	0.000	0.61***	0.13	0.000	0.60***	0.13	0.000
Number of patent applications[a]	0.08***	0.02	0.000	0.09***	0.02	0.000	−0.03***	0.00	0.000	0.10***	0.02	0.000	0.10***	0.02	0.000
Unemployment rate	−0.01+	0.00	0.089	−0.01**	0.00	0.001	0.00***	0.00	0.000	−0.01*	0.00	0.034	−0.01**	0.00	0.001
FDI	0.01***	0.00	0.000	0.01***	0.00	0.000	0.00***	0.00	0.000	0.01***	0.00	0.000	0.01***	0.00	0.000
Political stability and absence of violence/terrorism	−0.31***	0.04	0.000	−0.14**	0.04	0.001	−0.03***	0.00	0.000	−0.20***	0.04	0.000	−0.13**	0.04	0.002
Regulatory quality	−0.09	0.06	0.135	0.15*	0.06	0.021	−0.14***	0.00	0.000	0.13*	0.06	0.040	0.19**	0.06	0.003
Rule of law	0.50***	0.08	0.000	−0.06	0.09	0.525	−0.08***	0.00	0.000	0.29***	0.08	0.000	−0.03	0.09	0.746
Voice and accountability	−0.33***	0.07	0.000	−0.29***	0.07	0.000	0.12***	0.00	0.000	−0.41***	0.07	0.000	−0.33***	0.07	0.000
Government efficiency	−0.04	0.07	0.548	−0.01	0.07	0.892	0.03***	0.00	0.000	−0.05	0.07	0.437	−0.02	0.07	0.765
Control of corruption	0.04	0.06	0.491	0.27***	0.06	0.000	0.09***	0.00	0.000	0.08	0.06	0.152	0.24***	0.06	0.000
Linguistic diversity	−0.04	0.08	0.619	0.13+	0.08	0.094	−0.17***	0.00	0.000	0.18*	0.08	0.029	0.19*	0.08	0.019
Globalization	0.04***	0.00	0.000	0.03***	0.00	0.000	0.00***	0.00	0.000	0.04***	0.00	0.000	0.03***	0.00	0.000
Independent and mediating effects															
Future time reference				0.44***	0.04	0.000	0.26***	0.00	0.000				0.35***	0.05	0.000
Short term orientation[a]										0.80***	0.08	0.000	0.34**	0.10	0.001
Cons	2.30**	0.69	0.001	2.07***	0.69	0.003	1.39***	0.09	0.000	1.14	0.69	0.100	1.61*	0.70	0.022
Year fixed effect	Yes														
Observations	32,419														
Wald Chi^2	1174.11***			1310.69***			69,172.63***			1264.61***			1320.78***		
LR Test Vs. Linear Regression	247.03***			167.79***			10,058.47***			136.97***			143.47***		

B = unstandardized coefficients; SE = standard errors.

The indirect effect of strong-FTR on innovative new ventures was significant and positive (estimate = 0.0031, 95% CI = [0.0022, 0.0040])

[a] Log transformed.

+ Significant at the 10% level.

* Significant at the 5% level.

** Significant at the 1% level.

*** Significant at the 0.1% level.

importance of employing same measurements and analyses with different populations to provide a more solid foundation for subsequent theory development (Tsang and Kwan, 1999). Therefore, we conducted two experiments with the same experimental design, procedures, measurements, and analyses with two different samples of bilingual entrepreneurs in two different regions – Mainland China and Hong Kong – independently, in order to enhance the reliability of our experiments.

4.1. Samples

We derived our two samples from three sources: the alumni association of a large, public research university in Guangzhou, Returnee Entrepreneur Association in Shenzhen, and venture capital firms in Guangzhou. We reached out to a total number of 103 entrepreneurs from these sources in the period of August 2019 to May 2020 (62 were located in six major cities in Southeastern and Southwestern China, and 41 in Hong Kong). Data collection took longer than expected due to people's safety concerns over the series of democratic protests in Hong Kong and the self-quarantine and shelter-in-place orders to prevent the spread of the coronavirus during this period of time.

These two samples of entrepreneurs met the following criteria. First, they all had entrepreneurial experience and thus were familiar with the task of selecting which of the scenarios would represent a preferred start-up. This minimized the possibility that participants' lack of familiarity with the focal task would influence our empirical observations. Second, all participants were fluent in Mandarin and English. Our strategy of basing the scenarios and manipulations on real cases of bilingual versions demanded that we conduct our research with entrepreneurs who are highly capable of both languages (Sutter et al., 2018). Hong Kong natives' English learning has been inculcated since their younger age due to English as one of Hong Kong's official languages, and large-scale English education in Mainland China has been well-developed in the last decade. Respondents in our Hong Kong sample indicated that they started learning English at an average of four years old, and respondents in our Mainland China sample indicated that they started learning English at approximately eight years old.

In order to ensure the bilingual capability of participants, we used the Common European Framework of Reference (CEFR) to conduct a rigorous test for participants' speaking, reading, writing, and understanding of both languages (Verhelst et al., 2009). We randomly arranged 10 questions and 5 stories for each participant, asking each of them to accurately answer 10 questions and repeat the 5 stories they just listened. Three language experts were invited to grade each participant's Mandarin and English ability according to the CEFR scoring rules, and the grades ranged from A1 (beginner), A2 (elementary), B1 (intermediate), B2 (upper intermediate), to C1 (advanced), and C2 (proficiency). To avoid the possible errors caused by subjective evaluation, the Chinese Proficiency Test (HSK) and Oxford Quick Placement Test were simultaneously conducted to ensure the validity of the CEFR test. Consistent with Liu et al. (2017), the C2 level was required to qualify for our study.

Eight participants from Hong Kong were eliminated due to failing the English (seven) or Mandarin (one) proficiency test; and twenty-four from the Mainland China were eliminated due to failing the English proficiency test. A total of 71 participants remained in our final samples: 33 from Hong Kong and 38 from Mainland China. We conducted two experiments independently, with Experiment 1 completed in Mainland China and Experiment 2 in Hong Kong.

4.2. Experiment design and procedures

4.2.1. Articulation of task

To augment the validity of our research, we modeled our task, scenarios, and manipulations on documented cases of entrepreneurial projects. The entrepreneurial project for our experiment, "a single-wheel balancing vehicle," was ranked 10th among the top 30 winners at the 2017 "The Pearl River Angel Cup Business Plan Competition." Launched in 2012, this Competition is arguably the largest and most prominent business plan competition organized by the Department of Science and Technology in Guangdong Province, which draws thousands of participants each year. We purposefully developed two different scenarios of this business plan in both English and Mandarin. The imitative new venture scenario described "the single-wheel balancing vehicle" as a new product with improved appearance, color, and material based on mainstream technology and functionality, and evaluated its price to be 5% higher than the price of mainstream products on the market. Another adaptation of the script, the innovative new venture scenario, depicted "the single-wheel balancing vehicle" as a breakthrough, top-of-the-notch product with leading digital technology and original materials, and evaluated its price to be 55% higher than the price of mainstream products on the market.

In order to ensure the differential degrees of innovativeness between these two scenarios, prior to the experiment, we randomly selected a panel of 18 entrepreneurs (11 from Mainland China and 7 from Hong Kong, Macao, or Taiwan) in an industrial park to evaluate the innovativeness of each scenario. We adopted the three-item scale from Young et al. (2018) (specific items listed in the Main Study) for these 18 entrepreneurs to evaluate the innovativeness of these two scenarios, and t-test indicated that the innovativeness of the two scenarios was highly differentiated ($t = 4.87, p < .001$).

4.2.2. Data collection

For each experiment, we presented participants with the English (strong-FTR) and Mandarin (weak-FTR) versions of the same new venture scenarios. The two scenarios were presented in random order to minimize habituation effects. Data were collected at two time points. At Time 1, each participant was prompted to read the two scenarios in English and then to report their evaluation and decision on which of the scenarios was their preferred choice for new venture creation. At Time 2, approximately 30 min later, the participants were prompted to read the same two scenarios in Mandarin, and then to respond to the same question. At Time 2, the entrepreneurs were also asked to respond to a series of questions on control variables. Each experiment lasted an average of 53 min. In order to

minimize the effect of prior knowledge (Grégoire and Shepherd, 2012; Shane, 2000), we rated each participant's prior knowledge on the "single-wheel balancing vehicle." Results indicated that only 11 out of the 71 participants (15.49%) had heard about it yet they were unfamiliar with either the technology or market application of this project. The rest responded that they were not aware at all. Thus, our respondents were unlikely to be experts about this specific entrepreneurial project.

4.3. Measures

4.3.1. Innovative new ventures
If the innovative venture scenario was chosen, it was coded as "1" to represent more innovative ventures. Conversely, if the imitative venture scenario was chosen, it was coded as "0" to represent more imitative ventures.

4.3.2. Future-time-reference
FTR was coded as a dummy variable with "1" representing a strong-FTR language (English) and "0" representing a weak-FTR language (Chinese). For example, when each participant was prompted to read the English version of the scenarios, the independent variable was coded as "1," and "0" as "Mandarin Chinese."

4.3.3. Control variables
We controlled several individual variables that have been found to affect innovative new venture creation: entrepreneurs' *age*, *gender* ("1" = "male" and "0" = "female"), *education* (total number of years of education), *entrepreneurial failure experience* ("1" = "yes" and "0" = "no"), and *family income* ("1" = "the bottom 33%," "2" = "the middle 33%," and "3" = "the highest 33%") (Boudreaux et al., 2019; Shane, 2000; Young et al., 2018).

4.4. Analysis and results

Table 7 presents the descriptive statistics for both samples. We employed STATA 15 to conduct Hierarchical Logistic Regressions with maximum likelihood estimation to test Hypothesis 1. Table 8 summarizes the logistic regression results for both experiments. As indicated in Table 8, Models 1 and 3 were the benchmark models with all the control variables. Model 2 added the independent variable for Experiment 1 in Mainland China, and indicated a significant positive relationship between strong-FTR language and innovative new ventures (B = 1.91, *p* = .000). Model 4 added the independent variable for Experiment 2 in Hong Kong, and indicated that strong-FTR had a significant positive effect on innovative new ventures as well (B = 1.63, *p* = .004). Thus, Hypothesis 1 was further supported, and suggested that strong-FTR languages are positively associated with innovative venture creation. A closer examination of the results revealed that 49 entrepreneurs selected different venture scenarios as their preferred startup when they were presented in different FTR languages (English and Mandarin), and 22 selected the same venture scenario presented in different languages. These results confirm that different language structures would indeed impact entrepreneurs' decisions.

4.5. Robustness tests for replication study

In order to better control individual, contextual, and cultural effects on entrepreneurs' decisions, we conducted a series of additional experiments. The participants were selected with the same criteria following the same procedures as described above. We recruited a total of 120 new participants. Among these participants, 35 were female (29.17%), and their average age was 32 (SD = 7.73). In order to minimize the *cultural and contextual* effects, all participants were recruited from Southern China. In order to minimize

Table 7
Means, standard deviations, and correlations (replication study).

	Mean	S.D.	1	2	3	4	5	6
Experiment 1: mainland China sample (*n* = 76)								
1. Innovative new ventures	0.45	0.50						
2. Age	31.55	5.79	−0.04					
3. Gender	0.66	0.48	−0.13	−0.26**				
4. Education	17.45	2.20	0.03	0.52***	0.02			
5. Entrepreneurial failure experience	0.24	0.43	0.00	0.36***	−0.12	0.06		
6. Family income	2.32	0.70	−0.03	0.46***	−0.23**	0.20*	0.46***	
7. Future time reference	0.50	0.50	0.42***	0.00	0.00	0.00	0.00	0.00
Experiment 2: Hong Kong sample (*n* = 66)								
1. Innovative new ventures	0.52	0.50						
2. Age	31.91	5.15	0.01					
3. Gender	0.85	0.36	−0.07	−0.34***				
4. Education	16.39	1.77	−0.04	0.11	0.38***			
5. Entrepreneurial failure experience	0.15	0.36	0.16	−0.08	0.18	−0.10		
6. Family income	2.42	0.61	−0.07	−0.03	−0.12	0.19	0.12	
7. Future time reference	0.50	0.50	0.36***	0.00	0.00	0.00	0.00	0.00

Note: ** significant at the 5% level, ** *significant at the 1% level.

Table 8

Logistic hierarchical regression results (replication study).

Variables	Innovative new ventures											
	Experiment 1: mainland China sample						Experiment 2: Hong Kong sample					
	Model 1			Model 2			Model 3			Model 4		
	B	SE	p Value	B	SE	p Value	B	SE	p Value	B	SE	p Value
Age	−0.05	0.06	0.418	−0.06	0.07	0.377	−0.02	0.05	0.774	−0.02	0.06	0.740
Gender	−0.75	0.55	0.167	−0.93	0.64	0.145	−0.94	0.91	0.300	−1.10	1.05	0.292
Education	0.11	0.13	0.394	0.13	0.13	0.309	0.08	0.17	0.628	0.09	0.17	0.589
Failure experience	0.18	0.64	0.778	0.22	0.64	0.728	1.21	0.82	0.140	1.41	0.95	0.139
Family income	−0.14	0.42	0.729	−0.18	0.44	0.688	−0.45	0.48	0.341	−0.53	0.50	0.296
Future time reference				1.91***	0.54	0.000				1.63**	0.57	0.004
Constant	0.19	1.98	0.924	−0.72	1.98	0.715	0.97	2.86	0.734	0.31	2.88	0.914
Pseudo R^2	0.03			0.16			0.04			0.14		
Observations	76						66					

Note: B = unstandardized coefficients; SE = standard errors.

** Significant at the 1% level.

*** Significant at the 0.1% level.

the *market* effect, the scenarios clearly indicated that "The project was to target the market of Mainland China." In order to control for other *individual* effects, at the end of the experiments, the participants were asked to fill out a short survey on their *experience with hi-tech industries, individual risk-taking propensity* (Meertens and Lion, 2008)*, individual future-time orientation* (Zimbardo and Boyd, 1999), and *prior knowledge* on the product described in the scenarios. These 120 bilingual entrepreneurs were randomly assigned to four groups with 30 in each group. Instead of having the same group of participants read the English and Mandarin versions of the scenarios, we prompted two groups to read the English versions of the two scenarios presented in a random order and the other two groups to read the Mandarin versions. The results indicated that strong-FTR has a significant and positive effect on innovativeness (B = 1.43, *p* = .025), and are highly aligned with the results reported in Table 8. To summarize, employing a series of scenario-based intra-group experiments with bilingual entrepreneurs, our Replication Study further supported Hypothesis 1 that strong-FTR is positively associated with innovative new ventures.

5. Discussion

As a departure from previous research investigating cross-national variations in entrepreneurship from institutional and cultural perspectives *in isolation*, this research provides a theoretically integrated picture of how institutions with strong-FTR languages and cultures with short-term orientation influence the innovativeness of new ventures across different countries. The Main Study utilized merged, multi-level, and multi-source data of 34,673 entrepreneurs from 42 countries to test our model in its entirety. Our results provided compelling evidence that institutions with strong-FTR languages and short-term oriented cultures are more likely to foster innovative new ventures. Further, strong-FTR influences innovative new venture creation through its positive association with short-term oriented cultures.

5.1. Theoretical implications

The findings presented in the current research contribute to linguistic relativity theory, culture theory, and 'time and entrepreneurship' literature in a number of ways. First, although linguists, philosophers, and psychologists have long believed that language shapes individuals' cognitions and behaviors, only recently have scholars started to connect language with decision-making and attempted to provide empirical evidence for this link. In this regard, an emerging literature has examined the effects of language, i.e., *the function and usage of words in business communications*, on entrepreneurial outcomes (e.g., Anglin et al., 2018; Moss et al., 2018; Parhankangas and Renko, 2017). These studies have primarily relied on content analysis to assess large volumes of words in entrepreneurs' written or verbal communications in order to gauge the impact of language. Nonetheless, efforts to investigate the impact of language structures, *as a form and facet of language,* are in severe paucity. This is despite realizations that language structures are particularly relevant to entrepreneurship (Drori et al., 2018; Hechavarría et al., 2018). Our study is among the first to extend future-time-reference, an important linguistic structure (Chen, 2013; Liang et al., 2018), to entrepreneurship theory and practice. Our findings provide additional confirming evidence for the influence of language structures on new venture creation, a prevailing but subtle influence that has been relatively unexplored to date.

Second, since Hofstede's cultural framework was introduced to organizational research back in 1980, IB scholars have long embraced the concept of cultural values to explain various international business phenomena (Venaik et al., 2013). Within entrepreneurship research, scholars have previously investigated how individualistic or uncertainty accepting cultures promote entrepreneurship (Autio et al., 2013; Cullen et al., 2014; Li and Zahra, 2012). We add to this literature by offering a valuable complement to previous work that has often dismissed the importance of temporal characteristics of cultural values. Our study reveals that national cultures with short-term orientation are more likely to foster innovative new ventures because new ventures, compared with large,

established businesses, face critical crisis points and time pressures and thus have to focus on present realities rather than long-term goals. By doing so, we enriched our understanding with respect to why some nations produce more innovative new businesses whereas others more imitative new businesses. We also filled the gap in the extant literature that has insufficiently examined the effect of time at the national level on entrepreneurship (Lévesque and Stephan, 2020). Prior research found that CEOs' high past focus and high present focus (consistent with short-term orientation) enhance new product introductions in stable environments (Nadkarni and Chen, 2014). Our study confirmed the role of short-term orientation in explaining innovation at the national level.

In addition, we responded to recent calls that urge investigation on the interconnections between institutional and cultural factors in their effects on international variance in entrepreneurship (Ahlstrom and Bruton, 2002; Cullen et al., 2014; Graafland and Noorderhaven, 2020; Li and Zahra, 2012). Motivated by the time-calibrated entrepreneurial action research at the national level (Lévesque and Stephan, 2020; Wood et al., 2021), we recognize the consistency in the time perspective inherent in institutions with weak-FTR (strong-FTR) and cultures with long-term orientation (short-term orientation). We found that they are positively associated. Thus, our research provides an important first step toward identifying critical time-sensitive institutional and cultural effects and testing how they influence innovative new ventures. Our study is also aligned with a core premise of institutional research that a nation's institutional profile is intricately connected with cultures (Ahlstrom and Bruton, 2002; Busenitz et al., 2000). It represents one of the first empirical investigations on mechanisms through which institutions may influence cross-national variations in new venture innovativeness. We showed the relevance of doing so for strong-FTR and short-term orientation, but this could be extended to other institutional and cultural dimensions.

Our data indicated a relatively higher correlation between strong-FTR and short-term orientation ($r = 0.62$ in Table 3). Therefore, we selected a sub-sample of countries exhibiting lower correlation between these two variables: Hong Kong, Brazil, Australia, Philippines, India, Mexico, Chile, and Colombia ($N = 16, 495$, correlation $= 0.27$) and reran the analysis. The results were largely aligned with the results presented in Table 2. Further, in order to partial out the effect of culture that is attributable to language, we orthogonalized strong-FTR and short-term orientation and reran the analysis. Again, the results were highly aligned with the results in Table 2. Overall, these additional results not only confirmed our findings but also suggested new research opportunities focused on understanding more intervening, causal mechanisms and contextual, moderating factors that underpin the relationships between FTR and short-term orientation with innovativeness of new ventures.

5.2. Practice and policy implications

This study suggests the following policy and practice implications. We found a positive association between institutions with strong-FTR languages and innovative new ventures and between short-term orientation and innovative new ventures. Given that it is likely infeasible to attempt modifying language and the national cultural value of short-term orientation, institutions may attempt to reframe innovation instead. In other words, instead of changing language structures in weak-FTR languages to mimic those of strong-FTR languages, or to attempt bringing large scale cultural changes, such that the risk and uncertainty associated with innovative ventures becomes more palatable, institutions may reframe innovation itself. That is, to present innovation as not necessarily associated with risk and uncertainty but in terms of future prosperity and stability. For example, institutions in weak-FTR contexts may present innovative new ventures as the mechanism through which future success and rewards could be achieved. This reframing could occur, as a start, in policy statements and outreach efforts geared toward entrepreneurs, within both governmental and nongovernmental institutions.

Efforts at reframing innovative new ventures as the engine for future stability and growth can also be complemented with institutional efforts to help entrepreneurs distinguish between true risk and perceived risk which may or may not be the same. Based on our study results, it appears that entrepreneurs in weak-FTR institutions were more likely to prefer new ventures that encompass "tried and tested" product/service models which are familiar to target markets and those that were based on established technologies or procedures. This is consistent with our arguments based on time perceptions about time in relation to FTR – entrepreneurs in weak-FTR institutions are more likely to hold less precise beliefs and sense greater uncertainty about future events of their new ventures and thus err toward more "well-established" business models. It is possible that the entrepreneurs' perceptions of risk and uncertainty pertain to both the process of bringing ideas to fruition as well as the ultimate success or failure of the venture itself. Institutional efforts to alleviate such concerns of entrepreneurs may take the form of help to entrepreneurs with various processes associated with creating new ventures such as legal issues, intellectual property protection applications, capital acquisition, talent acquisition and management, among others but particularly geared toward creation of innovative new ventures. Similarly, institutional efforts may help clarify and strengthen innovative venture ideas by providing professional evaluations of ventures in terms of both feasibility and desirability for success.

5.3. Limitations and suggestions for future research

As with all research, the current study suffers from certain limitations. First, it is important to acknowledge that the measure for innovative new ventures is self-reported in nature. Although prior research has validated this measure (Young et al., 2018), without additional confirming evidence, the validity of this instrument remains somewhat uncertain and the results of our research should be interpreted with caution. Second, although great efforts were exerted in the experiment design and collection of multiple large-scale, global datasets, the non-longitudinal nature of the experiment and GEM data (Young et al., 2018) limits the generalizability of our results. Longitudinal data, along with archival measures for innovative new ventures, will allow us to explore the long-term effects of language structures along with cultural values.

Our study offers several suggestions for promising future research. Echoing extant research considering language as an institutional factor (Chi et al., 2020; Drori et al., 2018; Hechavarría et al., 2018; Terjesen et al., 2016), we examined the effect of the FTR of the official language of the entrepreneurs' home country. Following Chen (2013), we proposed that FTR affects innovative new venture creation through the cognitive mechanism of time perception. As our study represents one of the first to apply these two cognitive mechanisms in examining how FTR affects future choices, we encourage future research to explore alternative theoretical explanations of our findings. For example, future research can directly draw upon institutional theories to examine how languages, as an institutional factor, may serve as institutional constraints or facilitators to shape entrepreneurial activities (Bruton et al., 2010). Another, more distinct, theoretical lens through which to examine the influence of language is provided by imprinting theory. Imprinting theory posits that "during a brief period of susceptibility, a focal entity develops characteristics that reflect prominent features of the environment, and these characteristics continue to persist despite significant environmental changes in subsequent periods" (Marquis and Tilcsik, 2013: 199). Accordingly, languages learned during the sensitive period of early childhood could exhibit a long-lasting, imprinted effect throughout the individual's life trajectory. Additionally, as the effects of linguistic structures have been increasingly investigated in economics, future research could utilize economic concepts such as probability function, utility function, or grain of partitioning (Mavisakalyan and Weber, 2018) to explain the influence of languages on entrepreneurial behaviors.

Future research is also warranted to investigate language effects at multiple levels on new venture creation, and during different stages of venture growth. For example, whether the entrepreneur is bi- or multi-lingual, whether the entrepreneur's team speak a diverse set of languages, whether the firm allows speaking of foreign languages during work hours, and the extent to which the economic, technological, and geographic conditions at the time of founding encourage a multi-lingual environment (Liang et al., 2018). All these can exert effects on new venture creation. Alternatively, an optimal balance among multi-level languages may exist that leads to the greatest innovativeness of new ventures. For immigrant entrepreneurs, it is also likely that the conflict, between the official language of their home countries and the official language of the countries they immigrated to, impacts innovative new venture creation. Our data included businesses "involved in early-stage entrepreneurial activity" (Reynolds and Hechavarría, 2015: 2) in order to minimize survivorship bias (Cassar, 2010). It would be interesting for future research to examine, as businesses grow beyond nascency (e.g., businesses more than six or eight years old), whether the effect of language continues; if yes, whether the extent to which this effect occurs stays the same; and whether this effect is prone to different intervening and contextual factors.

Linguistic relativity theory suggests that the impact and potency of language structures on individuals' cognitions and actions are relatively stable and persistent over time, and that individuals subconsciously "reflect elements" of their environment in proper linguistic structures (Chen, 2013; Dahl and Velupillai, 2011; Danziger and Ward, 2010; Slobin, 2003; Thieroff, 2000). Future research may be interested in seeking whether individual, organizational, and environmental factors may erode or amplify language effects for entrepreneurs. For example, previous research found that initial human capital and the economic context at the time of founding persistently influenced new ventures' survival rates for more than 10 years (Geroski et al., 2010). It might be fruitful for future research to examine the intriguing interplay between language effects and these factors and identify whether these factors decay, intensify, or transform language impacts as new ventures grow. Furthermore, although not predicted, our results indicated that several of our control variables such as GDP, GDP growth rate, number of patent applications, FDI, unemployment rate, and globalization had significant effects on innovative new venture creation (please see Table 2). Therefore, future research may want to extend this line of exploration to study how the munificent environment may exert a strong influence on the effect of language, as well as the effect of the alignment between linguistic structures and national cultural values, on innovation.

Finally, the results of this research signify the importance of strong- vs. weak-FTR languages for innovative new venture creation. The question with respect to whether and how language impacts human beings goes back centuries. For instance, one of the earliest documentation recording the powerful utility of language in Chinese history can perhaps be dated back to the reign of Qin Dynasty in 221 BCE, when China became a unified centralized state for the first time in history (Anirudh, 2017). Before the Qin unified China, a large diversity of languages existed, which stymied the development and growth of the Qin Dynasty. Li Si, the prime minister under the first Qin emperor, Qin Shi Huang, systemized the written Chinese language by promoting the small seal script. This standardized Chinese writing system was considered one of the greatest achievements of the Qin Dynasty, which had a "unification effect on the Chinese culture for thousands of years" (Anirudh, 2017). Accordingly, scholarly research may be warranted to explore the effects of language structures on national outcomes such as economic development, international trade and relations.

CRediT authorship contribution statement

1. Jintong Tang: conceptualization, literature review, original draft, supervision
2. Jun Yang: investigation, formal analysis, validation
3. Wenping Ye: methodology, formal analysis, investigation
4. Shaji Khan: conceptualization, discussions, review and editing

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