REVIEW ARTICLE

Chinese Education Examined via the Lens of Self-Determination

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Abstract Chinese education is controversial: it is not only lauded for Chinese students' high test achievements but also criticized for curbing students' deep learning and development into well-rounded individuals. In the current paper, we propose that self-determination theory (SDT) serves as a useful framework for anatomizing Chinese educational ecology, especially understanding the fundamental developmental costs behind Chinese students' high test scores. In the first part, we provide an up-to-date overview of SDT, which proposes that a growth-oriented motivation fueled by basic psychological needs underlies human development; hence, the role of education is to provide environmental support for these needs. After reviewing research evidence, we conclude that SDT serves as a valid theoretical framework for analyzing Chinese education. In the second part, we apply the lens of SDT to better understand the motivational dynamics that prevail in Chinese education. In doing so, we first primarily focus on the distal institutional level, thereby examining in detail how the high-stakes testing system headed by Gaokao fails to support—and may even thwart—basic psychological needs; we also address counterarguments favoring Gaokao, such as heightened involvement and alignment. We then scrutinize the pros and cons at the proximal level of the student environment—i.e., teachers and parents. Finally, we discuss existing reform attempts, which seemingly have very limited effectiveness. We propose that awareness of the problem and more holistic change are needed to realize more effective and sustainable change in Chinese education.

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Chinese education[1] has been controversial. On one hand, Chinese education leads the world in comparisons of educational achievement. For example, the results from the cross-national Program for International Student Assessment (PISA; Gurria 2014) consistently rank Shanghai-China as first in mathematics, reading, and science performance. However, at the same time, Chinese education has the potential to limit students' deep learning and creativity, integrative functioning, and socio-emotional development (e.g., Kirkpatrick and Zang 2011). Presumably, the top performance of Shanghai-China comes with some collateral damage. For example, some people have held the malfunctioning educational system responsible for the lack of Nobel Prize winners in science in the People's Republic of China (PRC; e.g., Lin 2009) and for suicides (e.g., Schick and Wang 2015) and homicides committed by Chinese students (e.g., Marriott 1991; Manthey 2014) for academic reasons (e.g., Roberts 2014).

The current paper attempts to address these complexities and employs self-determination theory (SDT; Deci and Ryan 2000), which is a prominent contemporary theory of human motivation and development, as a guiding framework. We propose that SDT may especially help to shed light on the "dark side" of Chinese education and allows for a better understanding of how Chinese education may lead to suboptimal educational and developmental outcomes combined with stellar performance in certain areas. To obtain a more balanced and holistic perspective, we also review arguments that favor the strengths of Chinese education.

Specifically, we aim to address the following three research questions in the current review. First, does SDT constitute a valid theoretical framework for promoting a better understanding of Chinese students' functioning? To what extent has this theory been tested among Chinese learners and are the results generally supportive? To this end, we will provide an up-to-date overview of SDT's key principles in relation to educational and cross-cultural dynamics and examine the existing empirical evidence. Second, given this theoretical basis, we addressed whether SDT allows for a better understanding of the pros and cons of China's high-stakes testing policy (i.e., Gaokao) as well as the parenting and teaching practices that are used by Chinese parents and teachers. Namely, how can contemporary Chinese education and its components be analyzed from the SDT perspective? Finally, given the limited effectiveness of educational reform initiatives, we examine whether a set of alternative measures can be proposed and developed based on SDT. These three research questions are addressed in the three main sections of this paper.

This paper targets two different audiences: first, it is oriented to those who care about Chinese education, which includes educational researchers, both in China and worldwide. We hope that this contribution may provide deeper insight into the ongoing motivational dynamics and problems that have been identified in Chinese education and provide directions for remediation and regeneration. Second, the present contribution is oriented to educational researchers who are interested in the topic of motivation. As a motivational theory, there have been questions about the validity of SDT for non-Western learners (Iyengar and Lepper 1999).

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[1] The analysis of Chinese education will focus on Mainland Chinese education, but in discussions of cultural universality in the motivation model of SDT, we may also refer to research that is based on samples from Taiwan and Hong Kong, which are culturally similar to Mainland China.

Thus, this paper aims to indicate how this theory can serve as an effective theoretical lens for analyzing the Chinese educational conundrum.

The Validity of Self-Determination Theory for Analyzing Chinese Education

The Nature and Processes Underlying Psychological Growth

As a macro-theory of human motivation, personality, and development (Deci and Ryan 2013; Vansteenkiste and Ryan 2013), SDT is based on the assumption that an active growth tendency underlies human beings' functioning. The self, as an integrative process (Deci and Ryan 1991), is postulated as the center of this growth tendency. When the self is functioning well (i.e., self-determined), the organism will experience growth and function at a higher level of integration, which is reflected in cognitive learning (Deci and Ryan 2013), the acquisition of a well-anchored identity (Weinstein et al. 2011; Soenens and Vansteenkiste 2011), the development of an inner compass (Assor 2012), and an increased capacity for emotional integration and well-being (Ryan 1995; Ryan et al. 2008), as well as more integration in the social matrix (Weinstein and DeHaan 2014).

SDT also proposes that there are three basic psychological needs, whose satisfaction serves as nutriments that allow the organism to maintain and energize its integrative functioning. The role of social context in general and the role of education is to facilitate, rather than interfere with, let alone thwart basic psychological needs. In this way, the social context has a dialectical relation to the organism and thereby has the potential to either nurture and foster development or block or even undermine growth. An overall representation of the SDT propositions is presented in Fig. 1, and an overview of supporting empirical evidence can be found in Deci
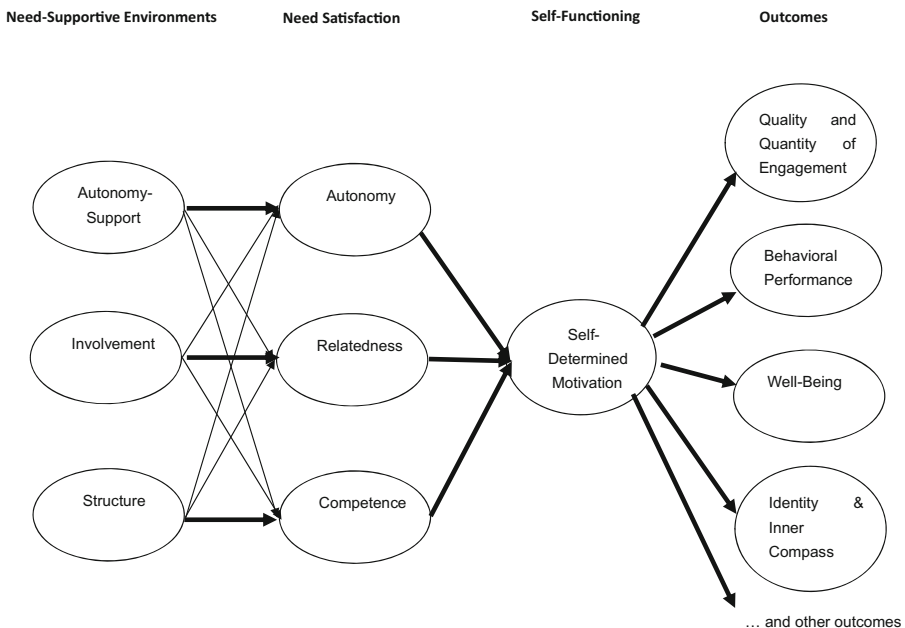

Fig. 1 SDT developmental model

and Ryan (2000) and Vansteenkiste et al. (2010). We will discuss portions of this model in detail below.

Self as a Motivational Process

The degree to which individuals display integrative functioning is derived from whether people's motives are congruent with or rather alien to their sense of self. When individuals engage in an activity out of interest, enjoyment, and curiosity (i.e., intrinsic motivation), for identification with the value that underlies the activity (i.e., identified regulation), or because the activity is congruent with the individual's broader values and ideals (i.e., integrated regulation), individuals volitionally endorse and participate in the activity. As such, their behavior is self-determined or autonomously motivated. In contrast, when individuals seek to avoid a sense of guilt or bolster their ego (i.e., introjected regulation), to avoid criticism or garner a sense of appreciation (i.e., external regulation), they experience coercion and alienation, such that their behavior is non-self-determined or controlled. These different types of regulation extend along a continuum, which is shown in Fig. 2 (reproduced from Deci and Ryan 2000). As a phenomenological marker for integrative functioning, autonomous motivation predicts optimal development and flourishing (Ryan et al. 2013).

Nurturing Growth: the Pivotal Role of Psychological Need satisfaction

Just as biological organisms require specific nutriments for sustenance and growth (e.g., water), humans flourish to the extent that they receive psychological nutriments. SDT identified the critical psychological nutriments as the three *basic psychological needs*, which include the need for autonomy, relatedness, and competence (Deci and Ryan 2000). Autonomy refers to people's need to self-organize their experiences and self-regulate their behaviors, while frustration that is related to this need involves feeling pressured and internally conflicted. Relatedness refers to the need to establish meaningful relationships with others, to care for others and be cared for, while frustration that is related to this need involves relational exclusion and the feelings of loneliness. Competence refers to the need to feel effective in interacting with the environment, while frustration that is related to this need involves feelings of failure and doubts about one's efficacy.

Social contexts that are replete with these psychological nutriments will energize individuals' organismic growth, as manifested through an increasing or sustained tendency to engage in intrinsically motivating and well-integrated behaviors. In contrast, a social context that fails to nurture or even thwarts these psychological nutriments will forestall individuals' development. Dozens of studies (e.g., Chen et al. 2015; Sheldon et al. 2001) have provided evidence for the growth-promoting roles of these three psychological needs.
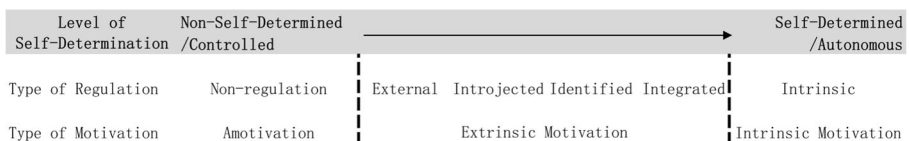
Level of Self-Determination	Non-Self-Determined /Controlled				Self-Determined /Autonomous
Type of Regulation	Non-regulation	External	Introjected Identified Integrated		Intrinsic
Type of Motivation	Amotivation		Extrinsic Motivation		Intrinsic Motivation

Fig. 2 The self-determination continuum (modeled after Deci and Ryan 2000)

Need-Supportive and Need-Thwarting Styles

SDT research has delineated what type of motivating style socializing agents, such as teachers (Reeve 2006) and parents (Grolnick and Ryan 1989; Soenens and Vansteenkiste 2010), can adopt to support or thwart individuals' psychological needs. The most researched motivating styles are autonomy support and control. Specifically, when socializing agents are autonomy-supportive, they provide choices, stimulate initiative, acknowledge people's perspective and feelings, and provide a meaningful rationale for requests (Deci and Ryan 2012). This motivating style primarily nurtures individuals' need for autonomy because it allows individuals to internally organize their feelings and behaviors (i.e., prompts an internal perceived locus of causality; Deci and Ryan 1985a). In contrast, when socializing agents are controlling, they pressure people to think, feel, or behave in specific ways through the use of commands, coercive language, love withdrawal, or guilt induction (Assor et al. 2004; Soenens and Vansteenkiste 2010). This controlling style interferes with individuals' need for autonomy. Several researchers have also delineated the characteristics of autonomy support and control in teaching (e.g., Reeve et al. 1999; Reeve 2006; Reeve and Jang 2006) and parenting contexts (e.g., Soenens and Vansteenkiste 2010; Soenens et al. 2007). For example, autonomy-supportive teachers spend more time listening to students, while controlling teachers monopolize learning materials.

In addition to autonomy support, two other forms of need support that can be provided by socializing agents are structure and involvement, which are often examined in educational and developmental settings. Structure primarily contributes to the need for competence and denotes the extent to which socializing agents provide clear and consistent guidelines and rules as well as the necessary guidance to effectively achieve desired outcomes (Grolnick and Ryan 1989; Jang et al. 2010). The opposite of structure is chaos, in which the environment is replete with confusing or contradictory rules, fails to communicate clear expectations and directions, and demands outcomes without articulating the means and necessary guidance for attaining these outcomes. For example, parents differ in the extent to which they have clear and consistent expectations for their children's homework (Grolnick et al. 2015) and teachers provide different amounts of constructive feedback and assistance when children have difficulties in the learning process (Jang et al. 2010).

A third feature of socializing agents' interaction styles, which primarily contributes to the need of relatedness, is involvement (Grolnick and Ryan 1989). In this context, involvement is used as an umbrella term that also includes sensitivity, responsiveness, or warmth, as indicated in the socialization literature (Nie and Lau 2009). Involvement suggests that the social environment cares and knows about the student/child and dedicates time and resources to the student/child. Involvement that is provided by teachers reflects their interest in, emotional support for, and affection towards their students, as well as the resources that are dedicated to their students (Skinner and Belmont 1993). Parental involvement in their children's learning has been conceptualized as including behavioral (e.g., participating in open houses), personal (showing that they care about school), and cognitive/intellectual (exposing the child to cognitive stimulations) components (Grolnick and Slowiaczek 1994).

Several studies on SDT have supported the theoretical model that a need-supportive socializing style contributes to need satisfaction, which then increases self-determined motivation and positive behavioral and affective outcomes. For example, Jang et al. (2009) found that perceived autonomy support from teachers contributes to positive outcomes in achievement, engagement, intrinsic motivation, and affect, which are mediated by

psychological need satisfaction. Levesque et al. (2004) found that students' perceived pressure and feedback in their environment relate to their well-being via the mediating roles of self-determined motivation and perceived competence. Similar models have confirmed these results for parents (e.g., Niemiec et al. 2006; see Reeve and Halusic 2009 and Chia et al. 2016).

It is important to note two considerations here. First, although the three aforementioned need-supportive dimensions are likely to be conducive to satisfying autonomy, competence, and relatedness, respectively, they also have general facilitating effects on the other needs (e.g., Ahmad et al. 2013). This suggests that, in practice, socialization figures use multiple need-supportive practices at the same time, which has implications for simultaneously satisfying individuals' needs. Second, autonomy and its support may be the most important of the three needs because it is directly related to self-determination. As such, relatedness and competence support alone cannot ensure that more integrative functioning is fostered (Deci and Ryan 2000).

External Events and Their Functional Significance

In addition to the motivating styles that socializing agents adopt in their interactions with children, external events, such as the delivery of rewards, the presence of competition, or the imposition of deadlines, also impact individuals' motivational functioning. In the SDT research, the term "event" has typically been used to refer to specific environmental occurrences (Deci and Ryan 1985b; Vansteenkiste et al. 2008). These external events impact individuals' psychological needs through the event's perceived functional significance, or psychological meaning. The psychological meaning that is attributed can be informational or controlling, and events can become enduring, structural components of dyadic relationships, groups, organizations, and societies.

For example, as a motivational strategy, teachers can create competition and reward winners with extra points. Providing competition-contingent rewards can be experienced as evaluative and pressuring (Reeve and Deci 1996), but being the winner provides competence-affirmative feedback (Vansteenkiste and Deci 2003). For another example, which will later be discussed in detail, at the broader, societal level, Ryan and Weinstein (2009) indicated that a high-stakes testing (HST) educational system—in which considerable rewards and/or punishments depend on the outcome of test scores—has a salient controlling aspect, in addition to providing informational feedback about students' performance.

SDT Research in Chinese Education

Conceptualization of Autonomy in a Cross-Cultural Context

SDT proposes that its premises are universally applicable to all human beings. In psychology, the importance of relatedness and competence are widely recognized in diverse theories (e.g., Baumeister and Leary 1995; White 1959). However, SDT's proposition for autonomy is controversial. Proposing that autonomy is a universal need has been challenged by cross-cultural researchers for some time (e.g., Bond 1988; Markus and Kitayama 2003; Iyengar and Lepper 1999; Oishi 2000). For example, Markus and Kitayama (1991) argued that people in the West tend to adopt an independent self-construal, while people in the East tend to adopt an interdependent self-construal. In a cross-cultural investigation, Iyengar and Lepper (1999) found that having the ability to make a choice was more motivating for Anglo American

children, but choices that were made by in-group others (mothers or classmates) were more motivating for Asian American children. Iyengar and Lepper argued that the lack of choice did not diminish the motivation of Asian children because these children had different self-construal from their American counterparts.

However, debates about the function of autonomy are partially grounded in conceptual confusion about the notion of autonomy. In SDT, autonomy is conceived as experiencing volition and reflective endorsement and is differentiated from independence, individualism, or separation (Ryan and Lynch 1989), which may encompass greater cultural variations. Underscoring this conceptual differentiation, Van Petegem et al. (2013) conducted several factor analyses and showed that traditional measures for "adolescent autonomy" could be mapped onto two dimensions—volition vs. pressure, as defined by SDT, and distance vs. proximity, which reflects the extent to which individuals act independently and distance themselves from others rather than staying close to them and obtaining guidance and support. Importantly, only the SDT operationalization of autonomy was uniquely related to adolescents' well-being (see also Chen et al. 2013). Similarly, Soenens et al. (2007) empirically demonstrated the differentiation between social contexts that supported individuals' volitional functioning from those that promoted individuals' independence, with only the former contributing to psycho-social functioning (see also Fousiani et al. 2014).

A Review of Cross-Cultural SDT Research

Using SDT's definition of autonomy as an experience of volition, many studies have supported the pan-cultural role of this need in fostering optimal motivation and behavioral outcomes and have identified how it can be promoted by the social context. First, several researchers have sampled diverse cultural groups to examine universality vs. cultural-specificity on autonomy need satisfaction. Chirkov et al. (2003) conducted one of the first studies in this area and found that autonomy predicted well-being in all four studied cultures (i.e., South Korea, Russia, Turkey, and the USA). Sheldon et al. (2001) employed event-based methods to show that autonomy, in addition to competence and relatedness, predicted university students' well-being during satisfying events in the USA and South Korea. Recently, using rigorous invariance tests and structural equation modeling, Chen et al. (2015) reported that each of the three psychological needs equivalently contributed to university students' well-being across four countries, including China, the USA, Belgium, and Peru. Similar results have also been found in other studies on multiple countries, including nations that are as diverse as Brazil (Chirkov et al. 2005), Bulgaria (Deci et al. 2001), and Japan (Nishimura and Suzuki 2016).

Other studies have supported the importance of need support and the validity of the general SDT model (see Fig. 1) in diverse cultures. For example, Jang et al. (2009) found that need-conducive learning experiences predicted both productivity, as measured by engagement and achievement, and satisfaction, as assessed by intrinsic motivation and positive affect in Korean students. Levesque et al. (2004) showed that perceived pressure and informational feedback was related to autonomy and competence, which, in turn, positively contributed to well-being in a mixed sample of German and American students. Chirkov and Ryan (2001) simultaneously examined parent and teacher autonomy support and found that they contributed to self-determined academic motivation and well-being in the USA and Russia. Finally, Hagger et al. (2005) found that perceived teacher autonomy support in a physical education setting contributed to students' motivation and engagement in leisure-time physical activities in the UK, Greece, Poland, and Singapore.

A Review of SDT Research in Chinese Education

Using the conceptualization of autonomy as volitional experience, findings from SDT research in Chinese education are largely consistent. Vansteenkiste et al. (2005) conducted one of the first SDT-guided studies with Chinese students. They reported that an autonomous motivation to study positively predicted adaptive learning attitudes, academic success, and personal well-being, while a controlled motivation to study was associated with higher dropout rates, maladaptive learning attitudes, and decreased well-being. They also found that children's perceived parental autonomy support, compared to control, was related to more adaptive learning strategies and increased well-being and that these associations could be accounted for (i.e., were mediated) by students' autonomy for studying.

Many Chinese and international researchers have followed the lead of this research and examined the role of autonomy in Chinese students' learning. First, several studies corroborated the finding that perceived teacher autonomy support predicted autonomous learning motivation. For example, Zhou et al. (2009) demonstrated that perceived teacher autonomy support was also conducive to autonomous learning motivation in Chinese students who were living in a rural area, which was less influenced by modern Western culture and more traditionally collectivist. Specifically, they found that student-perceived teacher autonomy support predicted a positive change in course-specific self-determined motivation, which, in turn, positively predicted students' interest, competence, and choice.

This result has been further supported with studies that used diverse methods. For example, Lau (2014) pre-post comparison study showed that students' perceptions of instruction that granted autonomy and structure predicted within-year positive changes in Hong Kong students' intrinsic reading motivation. Further, using vignette-based methods, Zhou et al. (2012) reported that although Chinese, relative to US students, perceived teaching scenarios to be lower on control, when they did perceive this pressure, Chinese students reported lower motivation as did students in the USA. Bao and colleagues (Bao 2006; Bao and Zhang 2008) employed an experimental design to show that Chinese students endorsed the personal significance of a boring learning task to a greater extent and expended more effort when their teachers instructed them in an autonomy-supportive way, which was operationalized as providing rationales, acknowledging feelings, and providing choices. Using a qualitative approach, Li (2005b) analyzed classroom observation data from Chinese middle school teachers and found that there were three types of motivating styles (i.e., high control, moderate control, and autonomy support). Quantitative analyses also indicated that teachers' self-reported autonomy-supportive (as opposed to controlling) motivating style was positively related to students' intrinsic motivation.

Subsequently, research indicated that autonomous motivation predicts a wide array of desirable outcomes, including continued persistence, engagement, creativity, and performance. For example, Bao and Lam (2008) found that autonomous motivation towards school work significantly predicted classroom engagement, which was not moderated by student-teacher relatedness. Chinese middle students who perceived that their teachers were autonomy-supportive reported more self-determination, which was positively related to engagement and math scores (Qiao 2006). Liu et al. (2013) found that overall autonomous motivation was positively related to Chinese adolescents' creative thinking, but this relation did not hold for senior high school students whose parents had high involvement. In a sample of Taiwanese elementary school children, Shih (2008) reported that child-perceived autonomy

support was positively related to children's adaptability, including intrinsic motivation and emotional engagement.

Another series of studies addressed whether the motivational benefits that are associated with perceived autonomy support can be accounted for by perceived need satisfaction. For example, Qian (2007) found that teachers' psychological need support predicted junior high school students' experienced need satisfaction, which subsequently related to their autonomous motivation and several adaptive outcomes, which included concentration and persistence. Taylor and Lonsdale (2010) reported that Hong Kong participants' experienced autonomy support contributed to their subjective vitality and efforts via the mediation of basic psychological needs satisfaction. In addition, Chen et al. (2014) replicated the positive correlation between basic psychological needs and well-being.

Considerable research has also explored the role of autonomy support outside the classroom, based on Vansteenkiste et al. (2005) study. For example, Cheung (2014) found that parental autonomy support vs. control positively predicted children's academic ability and achievement, and this effect was equivalent for Chinese and American students. Specifically, Chinese participants were recruited from local middle schools in a large northeastern province in China. Mother-child pairs collaborated to complete Raven tasks. The findings suggested that when mothers made greater use of an autonomy-supportive guiding style, children performed better on a subsequent Raven Test, even after controlling for their pre-interaction score. When mothers were controlling, there was an opposite effect. These effects were generally consistent across three types of informants (mother, child, and observer) for mother's autonomy support and control. Moreover, children's reports of their mothers' control in seventh grade predicted lower school achievement (GPA) 1 year later, after accounting for children's achievement in the seventh grade.

Similarly, Tong (2015) found that although mothers' unsolicited interventions during a task were perceived as controlling by American children but not by Chinese children, children's perceived control significantly predicted reduced task motivation across both groups. This is consistent with the "universalism without uniformity" perspective of autonomy-supportive and controlling parenting (Soenens et al. 2015). Further, several studies found that parental psychological control yielded maladaptive outcomes, including depression symptoms among seventh grade Chinese students (Wang et al. 2007) as well as Chinese adolescents' aggression and withdrawal (Li et al. 2012). Conversely, parental autonomy support predicted Chinese children's endorsement of growth-promoting (i.e., intrinsic) values, which, in turn, predicted well-being (Lekes et al. 2010).

Finally, the benefits of autonomy-supportive interactions can be observed in vertical (e.g., parent-child) as well as horizontal relations. For example, Lynch et al. (2009) found that peer autonomy support was negatively associated with a discrepancy between ideal and actual self-concept and positively related to well-being across Chinese, Russian, and American students.

Summary: SDT Is a Valid Theory in Chinese Education

This research overview suggests that, in terms of our first research question, SDT applies to Chinese as well as Western learners. Admittedly, several questions that need to be addressed remain. However, the available research suggests that teacher and parent practices and characteristics of the educational system that support Chinese learners' basic psychological needs have multiple benefits, including more self-determined functioning, as well as better

learning and academic outcomes (Fig. 2). The literature reviewed herein legitimates our examination of Chinese education in greater detail, thereby addressing its pros and cons from the SDT perspective, which addresses the second research question in this paper.

An Analysis of Chinese Education Using Self-Determination Theory

This section evaluates Chinese education using the SDT principles that were previously introduced and relies on an ecosystem theory perspective (Bronfenbrenner 2009). The ecosystem perspective focuses on the interaction between the person and various nested levels in the environment. This perspective is compatible with the "organismic-dialectic" perspective that underlies SDT, which maintains that the active growth-oriented human organism is in a continual dialectical interaction with the social environment. Consistent with the layers that are differentiated in the ecosystem perspective, Deci and Ryan (2012) maintained that both proximal interpersonal and distal contexts can support basic psychological needs and the growth tendency within humans. For example, a child's motivation to study is affected on a daily basis by the motivating style of the teachers and the way in which the child's parents guide and supervise the child's schoolwork (e.g., Van der Kaap-Deeder et al. in press). However, teachers and parents are also embedded within educational systems that can affect their own motivation, needs satisfaction, and interaction styles with the child.

The central levels in the present analysis are the exosystem, or the educational system headed by Gaokao, and the microsystem, which includes parents and teachers. Accordingly, these two levels are discussed in separate sections. Throughout, we also touch upon the effect of the macrosystem, or the cultural level of analysis. We do not separately examine the mesosystem because there are few SDT studies that examine the interactions between diverse microsystems on children's development and learning. The SDT principles are organized and summarized based on an ecological structure in Fig. 3.

Gaokao: High-Stakes Testing in China

Description

Gaokao in Chinese literally means "high exam," which is short for The National Higher Education Entrance Examination. This annual matriculation examination was established in Mainland China in 1952. It is unitarily organized by the Department of Education of PRC and most high school graduates take this exam to access higher education (National Higher Education Entrance Examination n.d.). Gaokao is a uniquely designed educational system in the world, in terms of the high stakes attached to it (Edwards et al. 2012). There have been criticisms of the system's effects on students' functioning for decades (e.g., Kirkpatrick and Zang 2011; Lin and Chen 1995). We propose that the negative outcomes that result from Gaokao can be best understood from the SDT perspective. First, we briefly describe the high stakes of Gaokao, including its' historical legacy, and then we present research on how Gaokao may have impaired educational and developmental outcomes in students by not supporting or even thwarting basic psychological needs. Next, we examine several counter arguments that argue for the positive influence of Gaokao. We conclude this section by integrating the diverse perspectives on Gaokao.
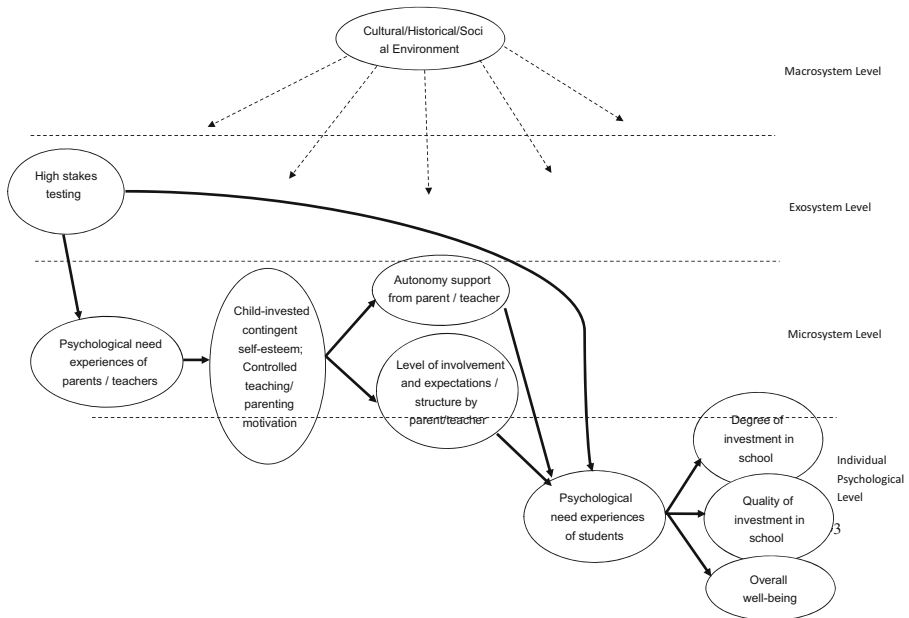
Fig. 3 Overview of an SDT analysis of Chinese educational ecology

Background

Gaokao has been described as the "test that can determine the course of life" (Wong 2012b). As Kennedy and Lee (2007) argued, examination systems in Eastern Asian countries, including China, follow a culture of "assessment for selection," which judges the amount of learning that has occurred. In contrast, Western education examinations adopt an "assessment for learning" culture, which is characterized by providing students with feedback on the progress that they are making in their learning. In China, being allowed to enter a university (especially a prestigious one) by passing the test has a large impact on an individuals' life because it is strongly connected to higher income and other opportunities (Mi 2015).

This situation is exacerbated by the presence of income discrepancies, one of the largest of which is between rural and urban living conditions. As Gu (2000, pp. 6–7) argued, the major disparity between rural and urban living standards drives rural students to work extraordinarily hard to succeed on the examination, which is the only way for them to eventually obtain an urban job and household and escape the stigma of being "peasants." Further, the University Entrance Examinations admission cutoff scores for a given university vary greatly from province to province, with students from provinces that have higher percentages of rural students often having higher cutoff scores (Kipnis 2001, pp. 20–21). Indeed, rural students have been found to perceive more academic pressure than city students (Sun et al. 2013).

The idea of the modern Gaokao is a natural outgrowth of large-scale testing that has been practiced in China for thousands of years. China invented the *keju*, or the Imperial Examination, and used it to select officials for the imperial government as early as the Sui Dynasty (approximately 600 AD). Since then, there have been nationwide examinations to enter the civil service bureaucracy (until 1905), despite the vicissitudes of dynasties. Because there is a large socio-economic gap between the scholar-official (*shi dafu*) class and the common people,

the *keju* is a classic case of HST. This social status discrepancy and the stakes attached to learning and testing have been documented in a series of widely read poem verses and idioms, such as "all walks of life are inferior, and only reading books is the high pursuit" (*Wanban jie xiapin*, *weiyou dushu gao*), "excel in learning and then serve" (*Xue er you ze shi*). Modern idioms that speak to this situation include, "Scores determine the destiny, Gaokao changes the life," and Gaokao has been analogized as "a thousand soldiers and 10 thousand horses across a single log bridge."

The Costs of Gaokao

From the SDT perspective, the most salient characteristic of the Gaokao system is its external orientation. This controlling motivational climate can be described by a widely recognized poem "*Quan Xue Shi*" ("Poem for Motivating Learning"), which was written by an emperor in the Song Dynasty. It's most popular verses read, "In books there will be golden mansions, in books there will be beautiful women."

As has been briefly discussed earlier, the functional significance of educational tests can be both informative and evaluative at the same time. When the stakes that are attached to the evaluation are unrealistically and dominantly high and the test is framed as the most important event in a students' life, the testing is likely to be perceived as very controlling and evaluative, which may have detrimental effects on individuals' need satisfaction and learning. Specifically, such a controlling testing system is likely to thwart students' need for autonomy because students feel that their learning is primarily or exclusively oriented towards achieving rewards or avoiding punishment, which may occur at the cost of learning for personal interest and/or valuing the learning activity (Ryan and Weinstein 2009). It is also likely to thwart the need for competence because of the "one-size-fits-all" feature. Admittedly, those who succeed on such tests may derive a sense of competence, but scholars disagree as to whether this competence is authentic since it has been achieved under a controlling context (Assor and Tal 2012). In addition to students, teachers who are in this system may also experience evaluative pressure, which translates into stress and the use of utilitarian teaching strategies, such as teaching to the test and over-investing in the amount of time that is used for exam drills (Robertson 2010).

A recent study (Chen et al. 2015) supported this perspective and showed that the Chinese youths' psychological need satisfaction was consistently ranked the lowest compared to three other cultures (US, Belgium, and Peru), and Chinese youth scored highest on need frustration. Hence, in the following section, we provide a detailed examination of the potential detrimental effects of Gaokao.

Autonomy First, the high stakes that are attached to Gaokao may push students to study for non-self-determined reasons. Shen (2008) reported that the proportion of students who only studied to take their exams increased as students grew older and exceeded one third of the students in their senior year of high school. Sun, the associate director of Chinese Adolescents Research Center, reported that among children and early adolescents between 6 and 14, only 30.3% of the students studied out of interest, which reflects intrinsic motivation, and that 59.8% of the students studied to obtain a good job in the future. Furthermore, a substantial percentage of students reported more controlling reasons, with 46.5% of students studying to please their parents, 7.6% studying to gain respect from others (Sun 2007), and 67.4% of the students considering obtaining a good ranking as a motive for investing in learning (Sun 2007). Although students can take remedial classes, more than half of these students attend for

non-autonomous reasons (for parents, teachers, following classmates), which increases with their year in school. It appears that students tend to adopt a mindset that is closed, prone to anxiety, marked by internal pressure, and failure-avoidant types of motivation (Pulfrey et al. 2011) in this type of high-stakes testing environment.

Separate from these activated controlled and failure-avoidant types of motivation, another potential loss for students in this system is that they rarely have the time, space, or facilitation to explore and form an authentic identity, or a direction that will guide them throughout their lives. To illustrate, one study (Liu and Liu 2002) showed that before taking the Gaokao exam and selecting their university major, 71.3% of 12th grade students did not know their true interests, 65.8% did not know what major or career would fit their potential and 71.2% were confused about the types of activities that matched their character. Due to a lack of a direction-providing inner compass (Yu et al. 2015), students are not likely to act upon their interests and personal values, thereby further failing to satisfy their need for autonomy.

As repeatedly shown in past SDT research (e.g., Deci 1971), the deficits that are associated with control may become even more prevalent once the control is removed. Indeed, externally regulated behaviors are poorly maintained once the controlling contingencies (e.g., grades) no longer operate (Niemiec and Ryan 2009). A student might study for Gaokao to avoid parental disappointment or feelings of guilt for not investing all of their time into preparing for the exam. However, once they have passed the Gaokao and enter the "real world," in which they are no longer monitored by a closed system, they are not likely to pursue their studies with the same effort. At the same time, their underdeveloped identities and inner compasses may leave them disoriented and amotivated. College education resemble an extended "free choice" period after high school and Gaokao, which might explain the low levels of engagement among Chinese university students (e.g., Ross et al. 2011).

Some students' disengagement may be explained as a reactance against external obligations, which may result from the chronic thwarting of basic psychological needs (Van Petegem et al. 2015). We also speculate that the adaptation to a controlling system often shapes controlled personalities, or controlled causality orientations (Deci and Ryan 2000), such that after Gaokao, young people continue to seek controlling environments. The prevalence of materialism among Chinese young people (e.g., the Ipsos 2013; Durvasula and Lysonski 2010), the increasing number who seek to join the hierarchical bureaucracy of civil service (e.g., Hong and Chen 2013), as well as the rather blind fever to major in business/management and related fields that promote non-self-determined climates (Yu and Levesque-Bristol 2015), may all be the result of this controlled orientation.

In short, the externally oriented and high-stakes educational system led by Gaokao has contributed to a "tunnel vision" of preparing for exams for controlled reasons. As a result, striving for success in exams has dominated Chinese students' lives, further crowding out the time and energy for developing an autonomous, direction-giving identity and inner compass. This may explain numerous non-self-determined functioning in students' post-Gaokao lives.

Competence College education is not appropriate for everyone because it has high intellectual demands. However, due to the income discrepancies between jobs for those who have and do not have a college degree and the radical expansion of students enrolling in college (see Wan 2006), an increasing number of students—for whom college education may not be the best choice—are drawn to Gaokao. This trend may explain the increasing frustration in competence that Chinese students report, which was documented in Shen's (2008) comprehensive report. Specifically, 34.2% of students almost never obtained a sense of achievement

from their studies and only experienced frustration and failure; 52.1% of students "feel very tired." Shen (2008) concluded that "as students age, their frustration increases, more and more students feel hindered in their studies, more and more students fear failures, choose to avoid challenges, and more and more indicate that their frustration lasts a considerably long time, and they feel isolated and sad once they think about the frustration." (p. 99).

The competence-thwarting effect appears to be especially salient among senior high school students as more than half indicate that their "studies do not evidence their capabilities, and they hope to do other things" (p. 102; Shen 2008), with more than one third reporting that they hate school. These students reported that they hate school because they feel that "studying is no use" and they "do not like to be restricted" – which fall into autonomy frustration, and "studying is too easy or too hard" – which fall into competence frustration (p. 105). Approximately 40.8% of Chinese high school students who are in their final year "do not want to study, for no reason." This is a classic case of amotivation and learned helplessness, which results from a chronic frustration of competence need satisfaction. The ensuing behavioral outcomes of this chronic need frustration include completing lower quality homework and increases in cheating (Kanat-Maymon et al. 2015).

As previously discussed, Chinese students' competence need frustration is higher than students in other countries (Chen et al. 2015). This observation is ironic given students' high performance in international educational achievement assessments, such as the PISA. There may be three reasons for this phenomenon. First, it is possible that the PISA sample is overrepresented with educationally developed areas or competent students because it only reflects students in Shanghai. Second, it is possible that Chinese students are objectively more competent but feel incompetent in the zero-sum competition climate. Indeed, objective indicators of competence do not completely align with subjective feelings of mastery and effectiveness (De Meester et al. 2016). Third, it is possible that PISA performance among Chinese students reflects over-invested training, rather than self-perceived competence. Accordingly, a survey in China found that 30% of people believed that Chinese students' performance on PISA did not represent their true proficiencies but reflected the excessive amount of time spent studying (Zhang 2013). Indeed, in addition to having the highest scores on the PISA test, Shanghai students also have the highest ranking for weekly time investments in homework, which is almost twice the average for other countries. In other words, Chinese student's high PISA scores may be due to their overinvestment and may not reflect a deeper sense of perceived competence.

Relatedness According to a survey published by China Daily Youth in 2006, more than 35% of adolescents are concerned about their feelings of loneliness. Pressure from parents (and to a lesser extent, teachers) is a primary source of relatedness frustration, which will be discussed in later sections. The poor quality of connections with peers in the school setting may also play a role in this frustration. A survey of primary and secondary school students conducted by the Chinese Youth and Children Research Center (CYCRC) showed that merely 40% of children reported that they had friends to play with (Cited in China's children too busy for playtime, China Daily 2007). Another survey that sampled high school students in a key school in Guangzhou indicated that 24.4% of the students had problems relating to their friends (Liu and Liu 2002). One reason for poor bonding with peers is that the overinvestment that is associated with high stakes testing reduces the time that is available for building and maintaining friendships; as several parents have stated, there is simply "no time for friendship" (Zhao and Gao 2014).

Another reason for the observed relatedness frustration may be due to the competitive atmosphere, as illustrated by a controversial motivational banner hung in a senior students' classroom that reads, "increase score by one, eliminate others by thousands" (*Tigao Yi Fen*, *Gandiao Qian Ren*). According to SDT, a competitive environment, to the extent that it is highly controlling and evaluative (Reeve and Deci 1996; Vansteenkiste and Deci 2003), may lead to the objectification of others (Vansteenkiste et al. 2014) and have negative implications for forming meaningful interpersonal connections (e.g., Kasser et al. 2007). Similarly, Zhao (2011) detailed how intense competition activates internal conflicts among young people, who feel torn between the pressure to outperform their peers and their desire to build intimate and socially engaging friendships. These conflicts may structurally deprive adolescents of the social opportunities that are necessary for forming and maintaining close friendships and challenge their skills and abilities for making social decisions that are mutually beneficial.

Parents and teachers sometimes act as spokespersons for the observed competition and thwart relatedness. For example, as Mei, a Chinese adolescent stated in an interview, "The feeling of jealousy doesn't exist between friends at the beginning. When adults compare our exam scores all the time, they create the feeling between us." Anecdotal reports also describe how the zero-sum competition climate has encouraged teachers to use motivating methods that harm relatedness, such as asking students to pick one "rival" in the class and set goal to beat that rival as way to engage themselves. Future research should examine whether these parenting and teaching practices contribute to relatedness frustration and social alienation.

A third reason may be discrimination towards and ostracism experienced by students who have low academic performance (labeled as "*Chasheng*"). With evaluations grounded in the test performance and ranking system, the low ranking "Chasheng" are often viewed as a "burden." As such, they are perceived to threaten the "honor" of the group because they decrease the average performance level for the class and school. Different strategies have been developed to marginalize "Chasheng," such as placing them in the back corner of the classroom or in a separate class, which compounds the implicit disrespect and stigmatization towards this vulnerable group, who often feel isolated. For example, parents do not encourage children to develop friendships with low-performing students but want them to affiliate with peers who can encourage or pressure their child to study hard (Zhao and Gao 2014).

Psychological Well-Being Psychological well-being is often the best indicator of overall needs satisfaction (e.g., Sheldon et al. 2001; Ryan and Sapp 2007), thus, this subsection summarizes Chinese student's well-being in the extrinsic educational system that is headed by Gaokao.

Zhou (2011) reported that there is a decrease in subjective well-being among high school students as they approach Gaokao. Shen (2008) reported that increases in negative affect and decreases in positive affect accompany increases in the year in school. As students age from years one to three in senior high school, there is a progressive decline in life satisfaction. Parallel to this decrease in well-being, there are increases in anxiety, depression, loneliness, and academic-related stress as students' progress through high school. Further, Shen (2008) reported that there is also an increase in the proportion of stress that results from internal and external control and pressure, such as parental expectations, a fear of failure, and setting unrealistic goals. Third year students' stress is primarily due to several forms of controlled motivation. Interestingly, there are also increases in the coping strategy of "leaving it alone" (i.e., passive coping, not seeking help).

Similarly, worries about exams are prevalent in children aged 9 to 18 (e.g., Hesketh et al. 2010). A survey by the Chinese Adolescents Research Center showed that for students from 9 to 18 years old, academic pressure and unsatisfactory exam performance were two of the three largest sources of unhappiness. Specifically, due to academic pressure, students reported feeling in a bad mood (76.2%), depression (55.4%), anxiety (54.2%), amotivation to learn (25.1%), low self-esteem (24.5%) and even desperation towards life (9.1%).These costs appear to increase with the grade year, as 84.7% of middle school students reported that the pressure from the exam is too high. Li and Prevatt (2008) showed that Chinese students have higher fear and anxiety than their Western counterparts.

For physiological well-being, Chinese students spend almost all their energy studying, even if they must sacrifice their sleep and health (Zhang 2013). The amount of time spent sleeping decreases with year in school, as 70% of third-year students reported less than 7 h per day of sleep, and only 20% of third-year students reported sufficient sleep. Suicidal ideation is reported by 38% of the students and suicidal attempts are reported by 15%. The higher risk for suicidal ideation and attempts is partially from the increased academic pressure from middle to high school (Cheng et al. 2009, and Unger et al. 2001, cited in Zhao et al. 2015).

The Potential Benefits of Gaokao

There are several arguments in defense of Gaokao (e.g., H. Liu and Wu 2006), many of which use sociological or policy perspectives. We only address the positive arguments for Gaokao from a psychological perspective relevant to SDT.

Higher Student Involvement The first potential benefit is that Gaokao enhances student's involvement in studying. As documented in the China-Japan-Korea-US high school students rights comparative research report (China Youth and Children Research Center research project group 2009), the amount of time that Chinese students spend on schoolwork considerably exceeds that of other participating countries (Table 1). This intensive investment is vividly showcased by the name of one of the prevalent (and controversial) strategies for preparing for exams—*Ti Hai* (literally: sea of practicing items). A classic series of books among the ocean of practicing item books is called "5 Years Gaokao, 3 Years Simulation," which contains 5 years of Gaokao tests and 3 years of simulation tests from across the country. It is very common for students to go through each of the tests in this and other preparation books.

Although investment in school is predicted by self-determined study motivation (Vansteenkiste et al., 2005), from the SDT perspective, such high involvement could also be understood in terms of the controlling HST context. Specifically, research based on SDT has provided some evidence that controlled motivation can contribute to behavioral engagement

Table 1 A comparison between high school students' school-day (excluding weekends, holidays, and breaks) studying times (%)

	China	Japan	Korea	USA
Studying at school over 8 h/day	78.3	1.1	57.2	0
Studying at home over 2 h/day	56.7	20.5	15.4	24.7
Studying in remedial classes or with tutors over 2 h/day	26.0	5.8	20.6	2.2

and performance. For example, Wang and Pomerantz (2009) found that both Chinese and US students experience deteriorations in autonomous motivation as their years in school increases, but compared to US students, Chinese students sustain a higher learning engagement and perceived importance of school work, which explains their higher test scores. The authors believed that this pressured engagement may be associated with problematic emotional states. Wong (2012a) reported that Chinese students who had higher performance goals, contingent self-worth, external regulation, and lower identified regulation had better test results in English and Chinese language courses.

Notably, the emphasis on student involvement in China is due not only to Gaokao but also to the Chinese culture in general (e.g., Biggs 2001). Chinese people's understanding of learning and education is deeply shaped by classic cultural texts that encourage effort and diligence, such as "Through constant devotion and effort, even an iron pestle can be ground into a needle" (*Zhiyao Gongfu Shen*, *Tiechu Mo Cheng Zhen*), "For the dedicated there is no difficulties on earth" (*Tianxia Wu Nan Shi*, *Zhipa Youxinren*) and "Without accumulation of small steps one cannot make a thousand miles, and without accumulation of trickles there will not be rivers and oceans" (*Bu Ji Kuibu*, *Wuyi Zhi Qianli*, *Bu Ji Xiao Liu*, *Wuyi Cheng Jiang Hai*).

Overall, Chinese culture places a heavy emphasis on the importance of education—for example, one of the Confucianism classics, the *Three Character Classic*, states, "At inception every individual is good; the human nature is similar but the behavioral habits are vastly different; if no education on children, their nature will go awry; the essence of education is in devotion" (*Ren Zhi Chu*, *Xing Ben Shan*; *Xing Xiang Jin*, *Xi Xiang Yuan*; *Gou Bu Jiao*, *Xing Nai Qian*; *Jiao Zhi Dao*, *Gui Yi Zhuan*), and it highlighted the appropriate roles for parents and teachers. This emphasis on education is also adopted by Chinese students who are not in China and who do not experience the HST influence of Gaokao—as well as Korean and Japanese students who share the same Confucian culture (e.g., C. Chen and Stevenson 1995; Hirschman and Wong 1986).

Better Structure A second argument that endorses the HDT dominated educational system is that there are clear expectations in the curriculum because the test and curriculum are closely aligned. Early et al. (2014) proposed that one of the key components in high-quality instruction is that the classroom provides content that is on time and on target with what students need to learn based on the relevant state and local standards and assessments. Education in the West, while more student-centered, may also be subjected to the pitfall of a laissez faire style. Indeed, even some educational psychologists believe that providing autonomy support necessitates a sacrifice in structure (Daniels and Bizar 1998; DeCharms 1984). Although such an under-standing is erroneous, as we will elaborate later, it illustrates the popularity of educational practices that grant students free time to do whatever they want. Some scholars have argued (Kirschner et al. 2006) that this problem could explain why the widely marketed "problem-based, experiential, discovery, constructivist, and inquiry-based" pedagogies are sometimes unsuccessful. These are foreign to China (e.g., Chen and Bennett 2012; Zhang et al. 2005); thus, it is possible that traditional Chinese education has more structure.

According to SDT, the HST system may "promote" alignment, although most likely in a suboptimal way, which is teaching to the test (Ryan and Weinstein 2009) and emphasis on test-taking skills (Suen and Yu 2006). However, we also recognize that the HST educational system may attend to the calibration of aligning the test with teaching, as people would not allow high stakes to be connected with tests that do not reliably measure what is being taught. Although

there is scarce research evidence in this area, we generally believe that the Chinese curriculum is closely aligned with the tests.

One exception may be the academic subject for the Chinese language, *yuwen*. Yuwen has incurred perennial controversy for its lack of validity in its highly subjective sections, such as reading comprehension and composition writing. There are many reports documenting that writers failed the Gaokao yuwen reading comprehension questions for their own articles (e.g., Zhuang 2009; Yang 2011; Pan 2009), which indicates that either the authors do not understand what they wrote or that the items lack content validity. In our experience, it was common for Chinese teachers to fail to provide sound explanations for the reading comprehension questions, even in the top high schools. The writing section is even more subjective and lacks standardization (there are also news reports that state that achieved writers fail the writing section). However, other than yuwen, the level of alignment and structure in Chinese education is higher than in educational systems where there are no required "official" tests that hold student's futures at high stake (e.g., the USA; Creese et al. 2016).

Towards an Integrative Summary

In this part, we attempt to integrate the pros and cons of the HST system in China. First, we reexamine the potential benefits of HST, including whether these benefits necessitate HST, and if so, whether these benefits outweigh the reviewed costs and increase the desirability of HST.

Can Higher Structure Be Attributed to Control? We noted earlier that autonomy support differs from laissez faire, or a lack of structure. To support this differentiation, Jang et al. (2010) showed that autonomy support and structure are not antagonistic. In contrast, they may be synergistic, as they are positively correlated with each other, and structure that is combined with autonomy support predicts the best student engagement outcomes (also see Sierens et al. 2009). Hence, to achieve high structure in education, it is not necessary to use a controlling style; rather, when educators understand autonomy in the right way, it is more likely that structure will follow along with the provision of autonomy support.

The high structure argument for Gaokao appears to be based on the assumption that an educational system is *either* characterized by high structure-high control *or* low structure-high autonomy support, as if high autonomy support entails low structure and high structure requires control. However, this forced-choice dilemma erroneously pits autonomy support against structure. Rather, one should envision an optimal education in which there is a clear syllabus that describes the learning objectives, the teachers have clear expectations, and the learning objectives and expectations are aligned with the tests, but at the same time the high-stakes tests are not the single route to achievement. In an optimal learning environment, both autonomy support and appropriate and clear structure are provided.

Can the Benefits of Control for High Student Involvement Outweigh Its Costs? Since control is opposite from autonomy support, the question is whether the student involvement pressured by a controlling HST system outweighs its costs (in which case HST would be more advisable). As such, Vansteenkiste et al.'s (2009) research is valuable because it directly compared the beneficial outcomes of controlled motivation to autonomous motivation using a person-centered approach. They identified students who had a good quality and high quantity of motivation: the good quality motivation group had high autonomous and low

controlled motivation, while the high quantity group had both high autonomous and controlled motivation. Consistent with Chinese education, students who are in a more controlling educational environment may have high controlled motivation, rather than being in the high quality motivation group. The researchers also found that the high quantity group had similar scores as the good quality group on cognitive processing, time and environment use, meta-cognitive strategy use, and the regulation of one's effort, which mirrors many of the benefits that are apparent in Chinese students. However, most importantly, they found that several unique benefits were associated with the good quality group, including a significantly better affective well-being, higher GPAs, and better results on indicators of procrastination and cheating. This suggests that studying for controlled reasons, even when the student has simultaneously high autonomous motivation, may limit outcomes. This implies that to choose HST is also to forsake the best of what could be within the students.

Another study (Nguyen and Deci 2016) found that when students had perfectionistic, high-level investments in their studies for controlled reasons, they suffered in their adaptive learning experiences and learning progress compared to those who had high investment for low-controlled reasons. This also supports the idea that although students who are driven by controlled motivations can uphold high level of striving, it is nonetheless suboptimal compared to autonomous forms of motivation.

These studies are supported with other research that identifies the limitations of controlled strivings. First, there is research that shows limitations in learning outcomes. Grolnick and Ryan (1987) conducted a longitudinal study and found that the controlled learning condition resulted in greater rote learning compared to the non-directed-learning condition, but there were decreases in interest, conceptual learning, and over an 8 ± 1-day follow-up, higher levels of pressure and deterioration in rote learning. Vansteenkiste et al. (2005) showed that extrinsic learning goals (which are associated with non-self-determined learning motives) and internal control undermine conceptual, but not rote, learning. Ryan and Brown (2005) suggested that scores on targeted tests should increase under the narrow focus on exams, but these increases do not generalize to other indices of achievement because the increases were obtained through methods that do not incite more self-motivation, interest, and value for learning.

However, the most severe costs may be found in the area of affective well-being, which was discussed under "Psychological Well-Being." Assor et al. (2009) discussed the affective ill-being that is associated with controlled strivings: "although self-worth motivation (focused on reasonable standards) might occasionally mobilize students to act in ways that temporarily increase their sense of social acceptance and optimism about the future, the enduring activation of self-worth motivation is likely to undermine well-being because it constantly arouses uncertainty about one's worth." (p. 495). Similarly, Liao and Wei (2014) supported this argument and found that affective well-being suffered as a consequence of striving for self-worth (one form of controlled motivation) under high academic pressure.

It is also important to note that the cultural emphasis on diligence should not be confounded with the controlling pressure that Gaokao imposes on effort. While the latter is antagonistic to self-determination, we believe that the cultural identification with hard work is compatible with self-determination: one can easily imagine a student who studies out of personal interest and importance and also recognizes that effort is necessary to achieve excellence. Hence, a diligent culture may be positive, while pressured overstrivings under HST is not. There is little empirical support for this assumption; thus, future research should continue to examine the differences in and combinations of culturally valued diligence and controlling oriented efforts.

Taken together, this section used SDT constructs to scrutinize the Chinese HST system that is headed by Gaokao. We have shown that the Chinese HST system does tend to thwart basic psychological needs in several ways. Although this system can have better structure and higher student involvement, these can also be achieved with more need-supportive systems other than HST and these benefits may be insufficient to compensate for the costs associated with HST. Overall, the SDT framework provides a more detailed understanding of the effects the of HST system in China.

Parents and Teachers in Education

Parents

We first describe Chinese parents' parenting profiles and then discuss their causes and consequences.

The Prevailing Chinese Parenting style Just like the hierarchical aspect of Chinese culture shapes Gaokao, Chinese culture also impacts parenting behavior and often in a controlling way. Specifically, the hierarchical orientation in Confucianism posits that parents own their children at birth, and thus, children's obedience and duties to their parents are unconditional (Zhai and Gao 2009). Thus, it is not surprising that controlling and pressuring children is the norm in Chinese parenting (Chao 1994; Chao and Tseng 2002). In fact, the forms of controlling parenting may be considered abuse in Western cultures (O'Brian and Lau 1995; Tang and Davis 1996). These controls are particularly inflicted in children's educational achievement. For example, Leung et al. (2008) conducted a large-scale school based survey in Southern China and found that disobedience toward parents and poor academic performance were the two most common reasons for child maltreatment. Li (2005a) and Zheng et al. (2006) reported that children's academic performance in school was a risk factor for maltreatment in the family. It appears that as long as the overall education is externally oriented and guided by Gaokao, parents are disposed to add fuel to it. As an article in the 2007 *People's Daily* stated, "Parents and teachers have made a 'silent pact' so that Music classes are cut back, exemption is given from PE classes, sleep time is shortened..." (Wen 2007).

In addition to contributing to more controlling styles, Gaokao also leads parents to have higher expectations and to be more involved in education. Crystal et al. (1994) reported that Chinese parents, compared to American parents, had higher standards for and reported lower satisfaction with their children's academic achievement. Shen (2008) found that 50% of Chinese students reported that their parents were more concerned about their academic ranking in school than themselves. These results reflect parents' elevated involvement. They may also be related to parental structure because these parents are more likely to set clear rules and expectations for their children and to monitor whether their children comply with these rules and meet their expectations. Accordingly, research has documented that parental involvement is conducive to child performance (Fan and Chen 2001; Jeynes 2005; Jeynes 2007), presumably because it promotes children's parent-oriented motivations (i.e., studying because of parents; Cheung and Pomerantz 2012). Hence, high stakes may have a positive effect on parenting, thereby promoting children's school performance outcomes.

However, based on SDT, we would predict that when high expectations and involvement are not combined with autonomy support, there will be suboptimal student outcomes. Supporting this prediction, in a recent longitudinal study that used a large sample, Murayama et al. (2015) examined parental over-aspiration, or setting aspiration levels to exert excessive pressure to control the child's behavior rather than being attentive to realistic child aptitudes, and found that it undermines students' learning achievement. Indeed, when children feel that their parents set high expectations without autonomy support, they may feel pushed and inadequate in their performance, which thwarts their psychological needs for autonomy and competence. A survey in China found that 83.6% of parents of middle school students required their child to rank higher than 15th in their class (there are normally approximately 50 students in a class), and 76.4% of parents of primary school students required their child to score higher than 90 (100 as the full score). Given such high expectations, it is logical that many students feel that they are never good enough (Sun 2007).

Interestingly, Cheung and Pomerantz (2011) found that Chinese parents' involvement was positively correlated with control, while American parents' involvement was positively correlated with autonomy support. Further, although Chinese and American parents' involvement positively predicted children' engagement and achievement, Chinese parents' involvement was less strongly related to children' perceived competence and positive emotional functioning. When involvement is provided without autonomy support, parents are involved with children's *academic performance* rather than their child *as a person*, and it is not likely that the child's need for relatedness gets truly satisfied.

Research on parental conditional regard (Assor et al. 2004) is also important to discuss. When parents are perceived as displaying conditional regard, children feel that their parents' attention, care, and appreciation depends on their meeting their parents' expectations for conduct and performance. Conditional regard is often coupled with guilt induction, which conveys that it is the child's duty to exert more effort and to obtain better performance to avoid disappointing their parents, who put considerable effort into their children. Conditional regard and guilt-induction both share a connotation of negative evaluation as parental love and appreciation are only deserved (and are otherwise replaced with painful feelings of disappointment or guilt) when children comply with parental expectations (Assor et al. 2004; Baumeister et al. 1994). Research has demonstrated that conditional regard and guilt induction may interfere with children's volition and may even provoke feelings of resentment towards parents. Indeed, Wuyts et al. (2016) found that Chinese (compared to Belgian) parents were higher on academic-contingent regard, and Chen et al. (2016) showed that to the extent that Chinese children perceived their guilt-inducing parents to be pressuring and controlling, they had increased need frustration and defiance vis-à-vis their parents, which was similar to their Belgium counterparts.

In further support of these arguments, Shen (2008) reported that there was a deterioration in Chinese parent-child relationships. As students grow older, there is increased control among both fathers and mothers. Among fathers, the control is in the form of forceful demands, while it is in the form of "nagging" among mothers (pp. 173–177). Further, there is a significant decrease in communication between children and their fathers and mothers as the children grow older. Interestingly, when Chinese children were asked an open ended question to list their wishes for their parents, the most frequent response was that they wanted more support, caring, freedom, and understanding, with fewer restraints, rewards/punishments, nagging, and reprimanding (pp. 289–290).

Notably, higher parental involvement and setting higher expectations may stem from both Chinese culture and the HST system, as high parental involvement is also seen in parents of Asian Americans and other East Asian families (Wollam 1992; Pomerantz et al. 2008). Indeed, there are many writings in Confucianism on the parent's responsibilities for educating children (e.g., the *Three Character Classic*). We speculate that the cultural influence on involvement and structure may be more positive than the HST influence on involvement and structure because the latter exerts control and incurs a more fundamental cost.

Parental Dynamics: Pressure on Parents Finally, we examine several factors that influence Chinese parents, which can explain their controlling parenting styles. In this context, Ng et al. (2014) found that Chinese mothers are more controlling because their self-worth is contingent on their children's performance. This is partly because traditionally Chinese families invest considerably in their children's educational development. A recent study (Liu et al. 2015) also examined the effect of parental motivation on encouraging children's studying and identified both autonomous and controlled reasons in parents. As such, while autonomous motivation for promoting child learning predicted teacher-rated child achievement, controlled motivation only contributed to learning when it was accompanied with autonomous motivation. Further, research has identified potential causes of parents' elevated child-invested contingent self-esteem, such as parents' unfulfilled dreams (Wuyts et al. 2016), controlled causality orientation and perceived social pressure (Wuyts et al. 2015). Perceptions of environmental threat (worry, instability, scarcity) also predict lower motivation in children, with controlling parenting as a mediator (Gurland and Grolnick 2005).

Several recent studies have further illustrated the inner conflict and lack of self-determination that characterizes Chinese parents' functioning. A qualitative study revealed that Chinese parents from younger generations are often very concerned with their children's full development and psychological well-being (Way et al. 2013). However, at the same time, parents had conflicting desires for their children regarding the stressful education system. They frequently complained about the "unhealthy" amount of academic burden that was placed on their child, yet they also had a resigned acceptance of this fact, using the phrase "*Meibanfa*" ("there is no other way"; p.392) (Crabb 2010). As one father stated, "On one hand, I don't want my son to be immersed too much in studying because it may cause problems when he grows up. But on the other hand, I have to urge him to study diligently because his academic performance will ultimately influence his future" (Zhang 2013). Chinese parents perceived external pressures to increase the amount of stress on their children (Wuyts et al. 2016). This conflicting dynamic is typical in zero-sum competition that is reflected in the Prisoner's Dilemma, in which individual rational behavior tendencies lead to a suboptimal collective outcomes (Axelrod 2006) and highlights the interaction between the microsystem and macrosystem in Chinese educational ecology (see Fig. 3).

Teachers

In the following, we examine the prevailing teaching style in China, as well as some possible antecedents of this teaching style.

The Prevailing Teaching Style Similar to parents, teachers in Chinese culture are viewed as having authority over children (Tweed and Lehman 2002). Shen's (2008) report found that

primary and secondary school students perceive their relationship with their teachers as primarily conforming and few students perceive an equal relationship. The vast majority (i.e., 96%) of students reported that they had received several forms of punishments. However, the students did not believe that the punishments were effective, and many students (40%) experienced the punishments as harmful. Similar to parents, extreme cases of physical punishment are reported from time to time, especially in underdeveloped rural areas, in which traditional Chinese culture, which emphasizes the importance of hierarchy, plays a significant role (e.g., Ma 2014). Li Yang, a pedagogue who advocates for students' submission to teachers and parents, to the extent that he asked three thousand students to kowtow to teachers in a large motivating rally (e.g., Du 2007), was highly recognized by the government (appointed as the 2008 Olympic torch carrier, and given an opportunity to have a rally in the Forbidden City). He is also heralded by high schools, especially in underdeveloped areas. The first author witnessed one of his rallies, in which he pressured students to study out of indebtedness to and guilt for their parents.

In more developed areas, teaching practices rarely enact extreme control, but nonetheless, under the influence of Gaokao, teaching practices tend to be less needs-supportive. For example, as noted earlier, one common method that teachers use to motivate effort-expenditure and competition is to publicize the rankings for every exam (e.g., Wang 2004). Shen (2008) reported that as children grow older, they perceive that their teachers are increasingly concerned with their test performance, at the expense of being interested in other aspects of the students' lives. In fact, in the final year of school, teachers are only focused on whether and how students are preparing for the exams. Consistent with this increased focus on performance, Shen (2008) reported that teachers' instructional methods become increasingly "traditional," with teachers taking the lead and students listening, while using student-centered instruction methods gradually decline. These findings are consistent with the observation that, under the influence of Gaokao, there are few assessments of adolescents' development as psychologically healthy humans (Shen 2008). In fact, Sanhao Xuesheng ("Three-Good Student"), an honor to be awarded to students who excel in moral quality, academic performance, and physical fitness, is increasingly only measured based on students' academic performance in senior grades.

Admittedly, there is still space to interpret test-oriented teaching in a positive way. As discussed with Gaokao, the narrow focus in instruction could potentially increase alignment between what the teacher does and what is important for the students' success. While there is not much wrong for teachers to focus on what matters the most, we reiterate that autonomy support is important for achieving the optimal outcome in addition to teachers' emphasis on setting clear expectations and monitoring children's progress towards these expectations. Consistent with this argument, Belgian high school students who perceived that their teachers set both clear expectations and were autonomy-supportive reported higher autonomous motivation, better concentration, persistence, and time management and fewer externalizing problems compared to students who perceived teachers as either setting clear expectations or being autonomy-supportive (Vansteenkiste et al. 2012). Teachers who are perceived to be high in both areas not only provide clear learning objectives and guidance for student learning behavior but also attend to students' inner worlds and help them engage in learning based on their personal values, the combination of which yields the most benefits (Jang et al. 2010). There is a need for similar research on the interplay between structure and autonomy support in China.

Additionally, similar to our discussion with parents—Chinese culture heavily emphasizes the importance of teaching. One Confucian classic summarized the responsibilities that are

expected of teachers: "Teacher is someone who transmits knowledge and skills, who helps develop a career, and who enlightens students with puzzles in life" (*Shi Zhe, Suoyi Chuan Dao Shou Ye Jie Huo Ye*). Such a cultural emphasis on teacher involvement may be positive. However, similar to parents, when the involvement based on the students' performance rather than the students as a person, it is not clear whether students' psychological needs are satisfied.

Teacher Dynamics: Pressure on Teachers Here, like for parents, Pelletier et al.'s (2002) model allows us to understand the factors that add to the controlling tradition of teacher roles (also see Soenens et al. 2012). They proposed that the more teachers perceive pressure from above (they must comply with a curriculum, performance standards, and demands from the principal and parents) and below (they perceive that their students are not self-determined), the less likely they are to be self-determined towards teaching. Research suggested that HST may impose pressure on teachers (e.g., Mathison and Freeman 2006), and a study that compared teachers from China and the USA also found that Chinese teachers experienced less autonomy and reported higher constraints for teaching science (Robertson 2010). Similarly, Nie et al. (2015) found that the pressure on Chinese teachers in government schools predicted decreases in intrinsic motivation and increases in controlled motivations to teach. For Chinese teachers, perceptions of constraints at work negatively predicted teachers' autonomy support, while teachers' self-determination and their perceptions of student motivation positively predicted teachers' autonomy support (Robertson 2010; Robertson and Jones 2013). In addition, controlled motivations among teachers predict controlled motivations to learn among students via teachers' perceived use of more controlling instructional behaviors (e.g., Roth et al. 2007).

Towards an Integrative Summary for Parents and Teachers

Chinese culture and HST have similar effects on teachers and parents—they both highlight the controlling aspects of teaching and parenting, while at the same time emphasize the importance of teachers and parents in providing involvement and structure. Although the controlling aspect of Chinese culture and HST has a negative effect on the need for autonomy, the influence of higher involvement and structure on student need satisfaction and educational and developmental outcomes is more mixed and requires additional analysis. Indeed, higher parent/teacher involvement may contribute to student achievement, as it may pressure students to place more effort into school work. However, in the HST system, involvement and structure are coupled with a controlling, rather than autonomy-supporting overall environment, thus, their functional significance are more evaluative and less nurturing for student's psychological needs. Hence, there may be limited positive outcomes and more likely negative outcomes, especially for affective well-being and deep learning. The cultural emphasis on parent/teacher involvement and structure may be more positive.

Towards a More Need-Supportive Educational Ecology

Educational Reform Initiatives

No review would do justice to contemporary Chinese education without discussing remediation attempts, such as suzhi education, the New Curriculum, and the "Reduce Academic

Burden" (*jianfu*) campaign. It is beyond the scope of this paper to provide a comprehensive evaluation of all of these initiatives, thus, we focus on the two most important initiatives—suzhi and the New Curriculum. We examine how these initiatives have fared and analyze them using SDT.

Suzhi education

The *suzhi* educational movement was put forward in 1990, and like other movements in China, in a top-down manner, by the National Educational Committee (Chen 2011). It was developed to counteract the broadly criticized test-oriented education (*yingshi* education) in China. Suzhi, which is usually translated as "quality," implies that the country wants students to have a more complete and well-rounded development rather than only being successful on exams. Unfortunately, accompanying its commendable ideology and widespread verbal advocacy, there is an inexorable resistance against it in practice. A comment by Zhou—the former Chinese Minister of Education—provides a good summary of this movement: "there are (still) also a considerable number of areas and schools single-mindedly focusing on the rate of students ascending to the next level of study. Students' workload and psychological pressures are heavy; intellectual education is emphasized while moral education, PE and Aesthetic education are neglected so that students' development is not holistic. The intellectual education is not a holistic scientific intellectual education but comes at the cost of suffocating students' interest, creative spirit and practical skills." (Dello-Iacovo 2009, p. 246). In 2007, Dong (2007) suggested that 57.7% of teachers believed that children's study load was heavier than it had been 5 years earlier and that there had been decreases in several indicators of children's health. A survey that was conducted by Shi and Li (1999, p75) among 390 principals from primary and secondary schools across Hebei Province found that although most principals supported the educational concepts in suzhi education, there were significant inconsistencies between their reported views and reported actions, which speaks to the futility of suzhi education.

There may be several reasons behind the ineffectiveness of this initiative—in its conceptualization and execution. We attempt to analyze these two aspects from the perspective of SDT. First, in its conceptualization, suzhi education is more ambiguous than what it appears. For example, it emphasizes the practice and mastery of skills (as opposed to verbal knowledge), rather than the self-expression and creativity that is emphasized in developing the whole person. Furthermore, in the current discourse, the purpose of cultivating these "high quality" people is not their own personal fulfillment but to meet the needs of the nation (Dello-Iacovo 2009).

To illustrate this lack of attention to the true development in the children themselves, suzhi education has a strong moral aspect (Lu 2000). Moral Education is taught in Chinese primary schools and is replaced with Political Education in the secondary curriculum. There are two reasons why this pedagogy may not result in moral development. First, it is not clear whether the moral principles that are promoted are consistent with human nature (for a more comprehensive discussion in SDT on the association between values and human nature, see Kasser and Ryan 1996; Sheldon and Kasser 2001). Specifically, there is evidence that hierarchical values (e.g., self-sacrifice), and in some cases collectivism,[2] which are often promoted in Chinese moral education, are harder to internalize to the self because they are,

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[2] Research on collectivism is more inconsistent, as some research shows that horizontal collectivism could be easily internalized.

relatively speaking, more at odds with human nature (e.g., Chirkov et al. 2003; Reeve et al. 2014).

The second reason that superficial moral education is less than optimally effective is that, without a child-centered, autonomy-supportive environment, the moral principles that are promoted as doctrines are very hard to internalize, and poorly internalized moral values rarely contribute to children's development into authentically more advanced moral judgment levels (Lekes et al. 2011; Knafo and Assor 2007; Weinstock et al. 2009). In short, suzhi education is an attempt to learn and borrow from Western educational methodologies without sufficiently committing to the conceptual bases that emphasize self-fulfillment, autonomy, and student-centered development that underpin them.

In addition to conceptual improvements, a second factor that may explain the ineffectiveness of suzhi education is its difficulty in execution. In this context, teachers' and school administrators' motivation, rather than students' motivation, has a prominent role. As Deci (2009) argued, "the effectiveness of a structured change process will require people to internalize the value and behavioral regulations that are its key components." (p. 245). If teachers and school administrators have not fully endorsed this initiative, the quality of change will be low. As Dello-Iacovo (2009) suggested, "discussions" in Chinese classrooms are sometimes little more than teacher-centered questions and answer, with teachers pressuring students to agree with them. "Self-directed" learning often turned into some teachers allowing students to do whatever they wanted to do, without providing guidance, feedback or setting requirements. Reasons for the low level of endorsement of teachers on this policy include, again, the lack of sufficient sense in its conceptualization, and there have been no changes in the HST nature of the educational system. Yu et al. (2005) suggested that many students from pilot project schools have not performed well in the examinations and top schools have only been able to implement suzhi education reforms to the degree that student examination results are not compromised. For teachers, it would be hard to reconcile the bonuses (extrinsic rewards) that they receive for graduation rates and advances into higher education, with an imperative for students' full development. For students, there is still a burden from the HST system and they must focus on exams. As Fan, the father of a 13-year-old middle school student in Beijing stated, "Even though schools are providing more opportunities for students to participate in extra-curricular activities to promote a well-rounded educational model, the activities become time-consuming and contribute to the pressure of preparing for exams" (Zhang 2013).

The New Curriculum

Another recent reform effort is the New Curriculum. The New Curriculum is similar to suzhi in that it aims to promote students' all-round development. However, in contrast to suzhi, which is more of a mode of education that is promoted but hardly carried out, New Curriculum is a program that is being implemented across the country. This program updates the content of the courses that are taught, and also attempts to improve instructional methods for teaching the content. It aims to reduce teacher-centered instruction in favor of student-centered learning that is characterized by active learners creatively solving problems, challenging existing knowledge, and participating in lively discussions (Adams and Sargent 2012).

Evidence for the effectiveness of the New Curriculum is extremely rare (our search resulted in very few studies, which were mostly qualitative), but it appears to be controversial. To our knowledge, there is one study that demonstrates positive outcomes. Sargent and colleagues

(Adams and Sargent 2012; Sargent 2011) examined the effectiveness of the New Curriculum and found that from 2000 to 2007, students in Gansu Province perceived their teachers to be lecturing less and engaging more in animated classroom discussions. In addition, students reported lower amotivation and higher emotional well-being, while regression analysis showed that the shift in instructional style explained changes in student affective and engagement outcomes.

In contrast, there are several complaints about the New Curriculum, which state that the curriculum is simply "old wine in new bottles" (Zhao et al. 2015) or "wearing new shoes to walk on the old path" (Guo 2010). From our perspective, one limitation of the New Curriculum may be that its reformed teaching methodology primarily focuses on transforming "spoon-feeding" into constructivist pedagogy (Guan and Meng 2007). The effectiveness of constructivism is problematic to begin with (Kirschner et al. 2006). To the extent that there are shifts in the locus of studying regulation from teachers to students, it could contribute to student autonomy and subsequent outcomes, which may explain the results from the Adams and Sargent (2012) study. However, to the extent that it is associated with abandoning structure (which is a common confusion), it thwarts the need for competence and may lead to undesirable outcomes. As Guan and Meng (2007) noted, "To embody the interaction between teachers and students, some teachers simply take the form of "question-answer," even when the question is self-evident; "To replace teacher-centered instruction, some teachers give up leading parts/dominant parts in instruction, some even take the student-centered requirement as an excuse to escape from hard work on instruction." (p. 601).

In addition, the New Curriculum suffers from the same problem as suzhi: the contradiction between the quality-oriented educational ideal and the exam-oriented educational reality. Lou's (2011) ethnographic study found that although the New Curriculum included more activities and projects in the textbook that related the course material to the student's interest, meaning and personal life, they were rarely completed. As an interviewed teacher stated, "I also wish I could spend more time discussing these projects, but we do not have enough time to cover them. Students need to take the county-level biology exam, and we have to achieve good grades for the school. There is so little time but so many things to teach. Doing a project is simply not an option." (p.78).

Suggestions for Sustained Change

Thus far, we have shown that reform initiatives have not been particularly successful in China. From our analysis, none of the reforms address the central issue of students' needs satisfaction and autonomous motivation. As summarized in the section entitled, "SDT Research in Chinese education," the microscopic level supports SDT propositions in China, and evidence shows that microscopic interventions that are based on SDT can improve student outcomes. Hence, our first expectation for future reforms is that they would yield more successful outcomes if focusing on promoting factors that are specified in SDT, such as autonomy-supportive teaching styles.

However, as we briefly suggested for suzhi education, the New Curriculum and in the earlier parent/teacher sections, there is a pervasive tension between change at the microsystem level and the HST system level. From our perspective, the dynamics at the higher organization level may counteract tendencies towards change at the classroom/family level. Sheldon et al. (2011) provided a theoretical explanation that suggested that the psychological characteristics of the cultural and social structures could moderate the effects of interpersonal and individual

personality variables on people's well-being and optimal functioning. In a recent paper titled "We can't change much unless the exams change," Yan (2015) summarized this interaction between the exosystem and microsystem levels in Chinese education.

Therefore, we believe that it is essential to understand the problems from a conceptual level, rather than the discrete behavior that is conducted in the classroom or family. Subsequently, modifications to higher level practices could be implemented to initiate real and lasting change for the entire educational ecosystem. Next, we make several suggestions as to where to initiate these potential generic changes.

First, it is important that teachers and parents refrain from emphasizing non-self-determined reasons for studying. Studying at school is an activity that has both intrinsic and extrinsic merits and can be both autonomous and controlled. Even though the broader environment— which is an extrinsically oriented HST—cannot be changed in the short term, what teachers and parents emphasize in the proximal microclimate can have a large impact. As such, Vansteenkiste and colleagues (for a review, see Vansteenkiste et al. 2009) conducted a series studies that showed that framing the learning activity in terms of intrinsic goals (a form of self-determined motive; e.g., self-development, affiliation, community contribution) enhances graded performance, the enjoyment of learning, and engagement in voluntary activities, compared to extrinsic goal framing (e.g., wealth, status, image). For school practices, it would be helpful to stop using controlling slogans and banners and to reduce the use of motivating rallies, which may be perceived as controlling.

Second, the exams could be improved. It could be expected that a college entrance exam that occurs multiple times a year could significantly lower psychological stress among high school students, and subsequently reduce their failure-avoidant motivation and use of internal pressure strategies. Standardization in tests is also critical for reducing introjection. For example, as mentioned earlier, the Chinese literature (yuwen) test in Gaokao has subjective sections that are rarely valid. The invalid yuwen test can externalize students' locus of control and foster a sense of helplessness and self-blame, which would thwart students' need for competence and autonomy and lead to controlled regulations and amotivation. In practice, standardization would help improve efficiency under a multiple-tests-per-year design. It would also be helpful to allow universities to have more autonomy in their enrollment decisions and to allow students to have multiple enrollment choices at the same time.

Further, the educational system should acknowledge its limitations, encourage in an autonomy-supporting manner students' exploration of their life goals, and help students realize what it means for them to study under such an educational system. SDT theorists have argued (e.g., Assor et al. 2002; Katz and Assor 2007) that in terms of autonomy support, choice is not as essential as the relevance behind the choice. Hence, for Chinese education, students are born into this system, and most do not have a choice for a non-HST education. Thus, it would be helpful to describe to them the broader picture of education and development, so that their efforts in studying, preparing for exams, and other aspects of personal development are more informed with their personal relevance, and based on reflective endorsement, rather than internal pressure and introjection. For example, it would be important to help students realize that (1) there is an inherent merit in learning for enjoying a life high on eudaimonic well-being (Ryan and Deci 2001), whether or not there are exams; (2) a significant amount of time is devoted to succeeding on exams under the current educational system at the cost of their personal development, and they are encouraged to reflect how much effort they want to invest in the educational arms race (Zheng 2013), given the research evidence on its harm. Currently, teachers tell students that "studying is for your own good," but these words are not true efforts

to help students identify meaning, and have been shown to be perceived as controlling (Reeve et al. 1999) or non-optimal (Simons et al. 2004), and may lead to avoidant and internally pressured motives. A similar approach would be to nurture a healthier personality in children, so that they are resilient against external control. For example, dialectical, mindful individuals (e.g., Peng and Nisbett 1999; Brown et al. 2007; Li et al. 2015) have a receptive awareness to both the autonomous and controlled aspects of learning activities, thus, they are more volitional in their engagement, even under controlling contexts.

Finally, but perhaps most importantly, fundamental change would require a revolution in the Chinese educational system. At a higher level, it would require a change in the cultural regulations in the country embedding the educational system, such that the social environment should be less based on hierarchy, and more on equality, democracy, and public welfare. Similar to other changes that are aimed at the organization level, the first step is to increase awareness of the problem, which we hope would occur as a result of our review.

Conclusion

This paper has attempted to achieve three goals. First, we provided an up-to-date comprehensive review of SDT in relation to education and Chinese culture, thereby providing evidence that SDT is valid for Chinese education. Then, using the SDT framework, we attempted to develop a better understanding of Chinese education. Overall, we found that the HST system may fail to support and even thwart the basic psychological needs in students, which may lead to suboptimal educational and developmental outcomes. Part of the influence of Gaokao is through parents' and teachers' mediating roles, which tend to be controlling in the family or classroom. Future reform could directly address students' basic psychological needs and autonomous motivation. Remediation that targets the microsystem are likely to result in limited effectiveness, and we suggest that awareness of the problem and changes in higher structures for fostering self-determination are critical to achieving a more humanistic education ecology in the future of China.

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