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〔Translation〕

Prosocial / vocational self-realization as the core of academic motivation in adolescents:

Overcoming *the myth of intrinsic motivation*

(secondary publication)

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Abstract

This study shows that vocational self-realization is the core of academic motivation in adolescents, after reviewing the findings on academic motivation mainly from the view of psychology. Through the process in which vocational self-realization motivates adolescents for school work, adolescents regard school work as a means of prosocial (intention to social contribution) self-realization, along with creating possible selves by their future time perspective, based on egocentricity of learning. The process also includes seeking social roles as the other side of identity formation, setting goals as expressions of values, and self-regulating and delay of gratification to achieve the set goals. This work also highlights that *the myth of intrinsic motivation*, the idea that places the highest value on enjoyment (or interests, curiosity) of academic contents itself in school work, is incompatible with adolescent school work. Especially, findings by Deci and his colleagues' self-determination theory, which strongly supports *the myth*, are not reasonable with respect to school work.

Keywords: Academic Motivation, Vocational Self-realization, Intrinsic Motivation, Instrumentality, Prosociality

青年期における学業への中核的な動機づけとしての向社会的／職業的自己実現

――〈内発神話〉を乗り越えて――

（二次出版）

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1. Introduction

This study aimed to show that prosocial/vocational self-realization is the core of academic motivation (motivation for school work) in adolescents by reviewing the findings on academic motivation from a mainly psychological perspective. In this article, "school work" refers to studying in schools and is narrower than learning. "Adolescents" generally describes students in between junior high (or middle) school to institutions of higher education, aged from 12 to 22 years. "Prosocial/ity," similar to social contribution, is the intention to help others. The author has claimed that relating school work to students' future work (Matsumoto 2009, 2012) and the need for self-realization as the will of realizing *becoming selves* (Matsumoto 2016) motivate students for school work.

In consonance with the author's claim, Arai (1995) and Sakurai (2009, 2017) argued that adolescent needs or intentions of self-realization predominantly motivate adolescents for school work. Arai (1995) hypothesized that what motivates school work turns from intrinsic motivation, reward and punishment, or sense of duty to self-realization in between childhood and adolescence. Sakurai (2009, 2017) proposed that in adolescence, intellectual curiosity and the needs for prosociality and competence are integrated to the need for self-realization, and academic motivation is formed of the needs and intrinsic motivation for learning.

The primitive view on academic motivation places the highest value on the interest or curiosity for academic contents itself in school work, while despising the instrumentality of studying or learning such as self-realization. This view can be named *the myth of intrinsic motivation*. Many school teachers seem to believe *the myth*. While there do not seem to be quantitative data, a high school teacher objected to the author's claim, based on *the myth*, in a lecture by the author (Matsumoto 2012).

Now, this study argues the validity of *the myth* and the significance of prosocial/vocational self-realization in adolescent academic motivation, reviewing studies on interest and the findings of psychology scholars, such as Deci and his colleagues' self-determination theory (SDT; e.g., Ryan & Deci 2017), which insists on the importance of intrinsic motivation.

2. *The myth of intrinsic motivation*

The myth of intrinsic motivation is defined as an attitude that places the highest value on seeking the students' intrinsic enjoyment (or interest, curiosity) for academic contents itself in school work. The attitude is absolutely accompanied by the belief that the enjoyment elicits long-term motivation for studying and makes the best studying performance. Hidi and Harackiewicz (2000) pointed out that even researchers also have this attitude. While it is difficult to show the roots or evidence of *the*

myth comprehensively, the main ones are listed below.

First, it is impressive for teachers to see students' delight, such as the latter's "I got it!" moment. When this happens, teachers expect the students will be motivated and achieve more in school work. Such experiences make teachers believe *the myth* easily. Second, as the primitive view that one's creativity is bound in the person (Csikszentmihalyi 1996), people tend to attribute excellent works to the personality of who achieves the works. This tendency also reinforces *the myth*. Third, *the myth* is reinforced if motivation throughout human life is applied based on analogy to infants' robust curiosity. This tendency includes the view that it is best for motivation that curiosity comes out by regarding curiosity as innate. Fourth, *the myth* is similar to the ideas that academics represent the supremacy of human works, such as some kind of intellectualism. Fifth, SDT, which insists on the importance of intrinsic motivation for learning, reinforces *the myth* (Hayamizu 1995).

The myth creates problems, such as students being forced to be interested in school work, teachers' extreme passiveness for educating or guiding in the sense that they wait until students are interested intrinsically (Hatano & Inagaki 1973), and the ensuing derision of the instrumentality of studying or learning. This work thus attempted to argue against *the myth*, reviewing the findings on motivation and interest in the field of psychology.

3. Nature and limits of interest

Primarily, we consider interest. In this article, curiosity is regarded as a form of interest. Curiosity is a cognitive function to reduce the gaps or conflicts between the known and unknown, whereas interest is a feeling or will regarding learning more regardless of these gaps (Alexander & Grossnickle 2016). Renninger & Hidi (2016) distinguished between a type of curiosity concerned with reduction of uncertainty and elimination of an undesirable state of ignorance from another type of curiosity involved in the anticipated pleasure brought by new discoveries. They regarded the latter as interest.

Interest consists of acquired knowledge and stored values (Renninger 1990; Renninger & Hidi 2016; Schiefele 2001; Voss & Schauble 1992). It mediates the perception and consolidation of information, as well as the actions based on the perception and consolidation (Renninger 2000). It also affects the qualitative level of goals and learning (Hidi & Renninger 2006). As such, interest fosters self-regulation (See 5.6.), encourages cumulative and creative efforts for a long time, and formulates the strategies required to perform superior in both qualitative and quantitative manner (a review by Hidi & Ainley 2008). In this way, interest is a motivating force for learning and a mental resource to perform in learning (Hidi 1990). We cannot ignore it as a prominent force demonstrated in school work (Prenzel 1992; Renninger 1992). Especially, interest strongly influences the choice of subjects and career paths (Harackiewicz et al. 2002, 2008 on choices of subjects, Harackiewicz et al.

2002, 2008; Krapp 2000; Seymour & Hewitt 1997 on choices and changes of majors, Krapp 2000 on vocational careers). These works show that interest emerges through a process of being constantly under more development (Renninger 2000), and that interest is inseparable from the perception of one's possible action and a representation of the possibility for oneself (Renninger 1990, 1992).

However, individual interest must be well-developed for interest to motivate students strongly and persistently. Hidi and Renninger (2006) demonstrated the developmental process of interest from situational interest to individual interest, based on previous research. The superior features of interest stated above are of individual interest (Hidi & Ainley 2008).

Previous research has shown some more features of interest in school work. First, considerable teaching and support, both qualitatively and quantitatively, are required to cultivate well-developed individual interest (Hidi & Harackiewicz 2000). Acquiring considerable knowledge is essential to cultivating interest (Alexander 1997, 2003; a review by Hidi & Ainley 2008) and needs considerable effort. Supporters for the effort are also needed (cf. Ericsson 1998). Notably, interest in adolescence is not the same as infants' curiosity; actions are complicated by cognitive elements mediating between curiosity and the actions since early childhood (Uebuchi 2008). Moreover, as interest is not innate or stable (Renninger & Hidi 2016), it cannot justify teachers' extreme passiveness for educating or guiding in the sense that they wait until students are interested intrinsically.

Second, interest cannot motivate studying in all subjects equally. Interest focuses attention or action toward a certain object (Hidi 2000) and is not activated across all domains (a review by Hidi & Renninger 2006). In other words, because everyone has both objects of interest and no interest (Schiefele 1986), interest is unique for everyone (Renninger 2000). Its uniqueness is more diversified as growing up (Renninger 1992). Moreover, in school work, the degree of intensity and reasons of interest are different for each learner in not only every subject but also every unit in a subject (e.g., Häussler et al. 1998).

Interest or intrinsic motivation for school work diminishes from around the third to the sixth grade in elementary school to adolescence (Hidi 2000; a review by Wigfield et al. 2006). This diminished motivation results from choice and optimization by interest in the basic process of human development (Baumert & Koller 1998), as well as conflict with motivation for activities other than school work and mismatch between students' interest and curriculum (including school culture). Hence, the decrease in mass indicators of interest may explain the more considerable loss in interest in one student than the maintenance or deepening of interest in others; that is, the decrease in mass indicators of interest may be attributed to the choices and concentration of every student.

Third, it is not always that interest alone makes studying better. According to examples of 11 years-old students, interested in reading or the theme of a reading material, or mathematics or the theme of a story problem, due to their (relatively rich) knowledge, they tended to be confused by irrelevant information to interpreting the material or solving the problem, estimate the degree of

difficulty of the material or problem to be lower inappropriately, not be able to interpret or solve by mismatch between the perspective of the material or problem and the one of themselves (Renninger et al. 2002). Then, there are many steps to academic achievement, interest cannot cover all the steps. we need to know that everyone has unique forms of representations even if who are interested in the same object (Prenzel 1992). Actually, interest merely influences academic achievement about 10% on average (a meta-analysis by Schiefele et al. 1992). Helping students to study better is needed, even if students are interested in (Renninger & Hidi 2016).

Fourth, because what we acquire knowledge by learning is accompany with judgement and exploration of meaning (Covington 1999), interest includes values such as utility. Indeed, an intervention study by Hulleman et al. (2010) shows recognizing utility of school work for daily or future life cultivates interest. Based on 15 years-old students' data of science in PISA2006, Ainley & Ainley (2011) also show that personal value of science (affinity for science, utility for life and understanding the world) broadly affects not only interest directly and indirectly through enjoyment of science but also engagement to science-related activities and future-oriented motivation to learn science in four countries contrasting cultural background. Moreover, amount of knowledge (test score) in science affects only enjoyment of science, but the effect of this is far smaller than that of the personal value. Consequently, it cannot be said that "understanding" of contents in subjects of school work cultivates interest. This is inconsistent with a insist by *the myth*. These " " means understanding as knowledge measured by a test.

Primarily, understanding includes not only amount of knowledge but also appreciation of value on the contents (cf. Matsumoto 2018). So, "interest in school work itself" claimed by *the myth* is ambiguous. Such mental phenomenon is unlikely.

4. Criticism of SDT

As mentioned before, SDT reinforces the myth. Below, three important findings of the theory for *the myth* are discussed.

First, the definition of intrinsic motivation: Deci (1975) defined it as a motivated activity that is rewarded from itself without obvious external reward and is not the means for something but the end. In this definition, the former is emphasized (Ryan & Deci 2017). Second, the finding of cognitive evaluation theory (CET) as a mini-theory of SDT indicates that intrinsic motivation is undermined if the activity motivated intrinsically is extrinsically motivated by other elements, such as rewards (Rigby et al. 1992 as a review). It is often reworded to the undermining effect. Third, the continuum model of regulatory styles (Ryan & Deci 2017), often reworded to the continuum model, classifies regulatory styles as continuum in terms of autonomy: intrinsic regulation corresponding with intrinsic motivation; integrated, identified, introjected, and external regulation corresponding with extrinsic

motivation; and non-regulation corresponding with amotivation. A lower (unsuccessful) self-determination is shown in this order.

4.1. Criticism of intrinsic motivation

The definition of intrinsic motivation by Deci (1975) is discussed here. Some researchers have pointed out the ambiguity between intrinsic and extrinsic motivation. Many reasons for the ambiguity are mentioned: human behavior in natural contexts produces various outcomes (and humans expect the outcomes) (Zimmerman 1985); behavior involves dealing with objects, such that Deci's conceptualization as "the activity is the end" is ambiguous (Nuttin 1980); it is difficult to distinguish behavioral persistence or unaware external incentives from intrinsic motivation and to find an activity without external incentives (Bandura 1977); and it is impossible to distinguish means-end relation of a specific action from complex hierarchical structure of means-end relations in human action (Kage 1995; Bandura 1977 and Raynor 1974a likewise).

Responding to these criticisms, Deci and his colleagues proposed the continuum model and other ideas, such as internalization and integration, which mean taking extrinsic motivation in intrinsic motivation (Deci 1992). Higgins and Trope (1986) also put forward a refined concept of Deci's definition. However, these cannot solve the issue pointed out by Lens (2001): Deci and his colleagues originally created a dilemma of classifying activities with goals that are completely the person's own as extrinsic motivation.

Indeed, the study on university students' well-being by Deci and his colleagues (Kasser & Ryan 1996) classified personal growth as an intrinsic goal. It is surely contradictory. To resolve this contradiction, thematic similarity has been proposed (Heckhausen 1989; Kage 1994, 1995). It means that if an act is specified by a goal, that act is regarded as being motivated intrinsically. Nonetheless, this concept is still ambiguous, given the difficulty of distinguishing specific means-end relation of an activity, as Kage (1995) mentioned.

The point mentioned by Lens (2001) is important for considering school work or learning, given that school work is oriented toward the future (Lens & Rand 1997; Leondari 2007) and has instrumentality (see 5.3.) for preparing for the future. School work also has instrumentality, as in the case of graduation certificates or social prestige. Meanwhile, if denying instrumentality, society ignores students' efforts in schools. No one would wish to do so. Moreover, learning itself as an element of school work has instrumentality. Edelman (1992) insisted that humans have acquired learning competence based on consciousness through the evolutionary process of natural and nerve selection, and have been adaptive. Thus, through humans placing their learning competence under their consciousness and maximizing the competence as a means, humans have achieved such ends and developed civilization. Education also contributes to maximizing human learning as a means of social development or self-realization. Regarding learning itself as the end is a by-product of this

process. It is no reason for supporting the idea of some kind of intellectualism, which places more values on such learning than on learning as a means. Thus, it is difficult to discuss motivation that inherently possesses instrumentality in learning or school work, based on Deci's definition of intrinsic motivation.

4.2. Overgeneralization that ignores the features of school work and adolescence

It is problematic that the findings by SDT, such as intrinsic motivation and the undermining effect, and interpretations of the findings, tend to be overgeneralized, in turn ignoring the features of objects of the study, namely, activities such as school work, play, and work.

Human motivation is aroused through interaction with the environment (Csikszentmihalyi 1985). Studies on human motivation are needed to take not only human nature but also the features of objects and activities into account (e.g., Staw 1974). For example (by Bandura 1977), when one is watching TV for a time without external reward, the scenario shows both one's character of being interested in a TV show and the TV show's feature of attracting interest. The activities surveyed in early studies on the undermining effect (Deci 1971, 1975; Lepper et al. 1973) were not school work but what participants' voluntary activities were before the studies began (Rheinberg 2008). Different from these activities, students must cope with the activity forced and assessed by others in school work, like jobs (Brophy 1983). Students are not motivated innately for school work (Alexander & Grossnickle 2016).

Meanwhile, school work is excluded from CET, because CET can apply to only the activity in which one is motivated intrinsically from the beginning and for which one can consciously maintain the motivation (Ryan & Deci 2000b). Moreover, studies on intrinsic motivation have been criticized for not considering developmental changes (Zimmerman 1985). As motivation signifies cognitive representations of the final state in one's wishes (Deci 1975), motivation is dependent on cognitive development. Thus, this criticism is reasonable. Especially, in adolescence, there are remarkable progress in such areas as abstract (logical and scientific) reasoning, meta cognition for one's own thinking process, self-consciousness coupled with consciousness of others, and (future) time perspective (e.g., Coleman & Hendry 1999). Such progress of cognitive development should be considered to affect motivation in adolescence uniquely.

4.3. Tests as extrinsic motivation

The preceding section stated that school work is excluded from CET. Testing as a type of extrinsic motivation is discussed here in illustration of the undermining effect in school work. Bandura (1977) and Lepper (1983) criticized the undermining effect generally, whereas Zimmerman (1985) criticized the effect in school work.

As a representative study on tests by SDT, Grolnick and Ryan (1987) had elementary school

students read a material with either announcement or no announcement of a retention test. They revealed that the students in the latter scenario outscored the former in concept understanding of the first test and retention of the later surprise test. Based on the result, they asserted that tests undermine intrinsic motivation. However, there are at least three issues in their finding and assertion. First, it is unfair that they implemented a concept understanding test but announced a retention test: only the students who did not receive the announcement could afford to understand it conceptually. Second, because a retention test is typical in schools, students tend to forget the contents of lessons after the test. Thus, the lack of autonomy is not proven to mediate between the announcement of the test and decrease in retention in the later test. Third, a test is needed to explore the relationship between intrinsic motivation and studying outcomes. However, if repeating tests unannounced, the students would anticipate the tests. Thus, the framework of this study is a paradox, because it is impossible that students are not tested or do not anticipate future tests. Rather, the finding by Grolnick and Ryan (1987) shows not the superiority of intrinsic motivation but the robust power of tests toward extrinsic motivation. This observation is supported by the fact that tests are implemented with expectations of students' best efforts.

Meanwhile, reward has the two sides of control and information (Deci 1975), which can be applied to tests (e.g., Sugihara 1985). Specifically, the former is a role to lead students to superior achievement, as in graduation certificates or licenses, whereas the latter is a role to inform them of points to be improved for superior achievement. Both sides influence students' motivation positively in subjects in which they are interested. Students tend to regard a poor grade as feedback for improvement in such subjects (Covington 1999). This is consistent with Hidi's (2000) idea of the immunization effect against the undermining effect for people interested in specific subjects.

Moreover, the meaning of the undermining effect as a conflict or paradox between intrinsic and extrinsic motivation is refuted empirically. For example, Lepper et al. (1997) measured the motivation of students in the third to eighth grades by separating intrinsic and extrinsic motivation, as differentiated by Harter's (1981) scale that treated both motivations as direct opposites. The correlation of these motivations was -.14. Lepper et al. (1997) also showed that while intrinsic motivation declined across the grades, the extrinsic motivation by teachers and tests remained constant. Hence, in school work, corresponding with its instrumentality, extrinsic motivation always stays with students and do not always cause undermining intrinsic motivation directly. The undermining effect is changed by each student's character, such as interest. Nevertheless, the findings by Grolnick and Ryan (1987) showed that retention tests as a type in school do not lead to superior achievement. Tests are needed to include important elements (Lepper 1983) and exclude undesirable ones in studying.

According to Amabile (1979), compared with when not announcing an appraisal at all, the outcomes of creativity and skillfulness are worse when appraisals are announced abstractly, and are equal to or

more when they are announced with specific criteria. Thus, it is important to not only make the criteria available for students but also that the criteria are easy for students to understand in tests. Further, it does not seem that competition motivates students to study. Presumably, it is true only if one takes part in an activity by one's own will, such as the case of contests like a piano competition.

4.4. Adequacy of the continuum model

As intrinsic regulation is the best of self-determination in the continuum model, it can be assumed to influence academic achievement the most positively. Many studies have examined the relation between regulatory styles and academic achievement (Baker 2003; Cokley et al. 2001; Fairchild et al. 2005; Hardre & Reeve 2003; Hayamizu et al. 1996; Koestner & Losier 2002; Nishimura et al. 2011; Taylor et al. 2014; Vallerand et al. 1993). In reviewing these studies, attention should be paid to the differences in and characteristics of the scales they used. These scales conceptualize regulatory styles as the reasons that students are engaged in school work. Academic Motivation Scale (AMS; Vallerand et al. 1989, 1992) is used most frequently in these studies, followed by Academic Self-Regulation Questionnaire (SRQ; Ryan & Connell 1989). AMS has five- and seven-styles versions. The latter divides intrinsic regulation in the five-styles version into three styles. These versions are mixed in the studies using AMS.

The items of introjected, identified, and external regulation are conceptualized differently in AMS and SRQ. None of the studies has stated the difference and the reason for using either. In SRQ, the items of identified regulation conceptualize the personal significance of school work abstractly. There are many reasons for the significance, and as such, the items may not be valid. In AMS, the items of external regulation conceptualize the extrinsic reward of future careers, and tend to correlate more closely between external and identified regulation (e.g., an analysis of the relation between regulatory styles and school adjustment in eight- to tenth-grade students by Otis et al. 2005; an analysis of personal profiles as patterns of regulatory styles in high school and university students by Ratelle et al. 2007).

Moreover, there are some critical defects that negatively influence the validity of the findings in these studies. First, some did not state the items of the scale, coefficient of determination in multiple regression analysis, and method of measuring academic achievement (especially the relation between the time when motivation is measured and the period covered by the measurement of academic achievement). Second, some studies modified arbitrarily the items or forms of the scale, such as modifying the seven-point Likert scale to five- or four-point scales. Third, some studies used variables of academic achievement before measuring motivation. Logically, motivation means what leads one to a future action; the variables should only be used after motivation was measured. If the stability of regulatory styles is proved, it may be valid to use the variables before measuring motivation. In the five-styles version of AMS, the correlations of the same style between two periods

are about .70 to .50 in study 2 of Taylor et al. (2014) and about .50 to .30 in Otis et al. (2005). While both surveyed students of almost the same ages, they are incongruous.

Considering the attention stated above and excluding the studies with defects, valid findings on academic achievement are shown only in two studies. The first is study 2 of Taylor et al. (2014). They surveyed Canadian students in the seventh to eleventh grades (five years of secondary school) using the five-styles version of AMS twice over a school year. Only intrinsic regulation (enjoyment of and interest in school work) in the first time contributed slightly to academic achievement (GPA). However, the correlation of intrinsic regulation with introjected regulation is closer than that with identified regulation. The second one is Nishimura et al. (2011), a survey of Japanese students using the original scale. Nishimura et al. (2011) showed that only identified regulation, consisting of future goals and abstract personal significances, as contributory to academic achievement (the sum of regular exam scores in five academic subjects) one year later, mediated by strategies of meta cognition measured two weeks before the exam. Shortly before the exam, introjected regulation, consisting of displaying one's own ability and competitiveness, also contributed to the achievement.

These findings do not prove the assumptions of the continuum model that regulatory styles can be put in order of intensity of self-determination as continuum and that intrinsic regulation influences academic achievement most positively. Especially, the findings by Nishimura et al. imply that an individual uses different styles depending on the situation. This corresponds to the findings by Ratelle et al. (2007) that some people have high intrinsic, identified, introjected, and external regulation. Consequently, it seems to be impossible that a study based on the continuum model contributes to the theory of academic motivation.

4.5. Ambiguity of parameters of intrinsic motivation

The studies reviewed above used the frequency of free choices, enjoyment, or interest as variables of intrinsic motivation in school work (Deci 1975; Ryan & Deci 2000a). However, based on the features of school work mentioned above, these variables are not appropriate. The topic on free choices was already stated; enjoyment and interest are discussed below.

Regarding enjoyment, Waterman (1993; 2005; et al. 2008) insisted that happiness from intrinsically motivated activities is divided into eudaimonia and hedonic enjoyment. The former is usually involved with development of the self, obtained from activities that require effort, and accompanied by realizing self-expression. The latter is obtained from activities that do not require effort, relatively, such as recreation. This classification is vague in studies on intrinsic motivation.

Regarding interest, it is distinguished cognitively from enjoyment (Silvia 2006) and is not always to be accompanied by such feelings as enjoyment and liking (Hidi & Harackiewicz 2000). For example, we experience a conflict by encountering what we cannot do in an activity in which we are interested (Prenzel 1992).

Moreover, when surveying on motivation, most of the studies tell only "(how much) are you interested in [something]?" directly. Renninger and Hidi (2016) stated that it is necessary to use behavioral variables together, such as the frequency of an action observed. The studies on motivation have been treating interest thoughtlessly.

As illustrated by empirical studies on the undermining effect, the dominant paradigm in SDT is behaviorism. The paradigm cannot show the psychological process of intrinsic/extrinsic motivation at all.

4.6. Summary of SDT

In summary, SDT has not presented logical or empirical findings to prove the thesis of *the myth* that intrinsic motivation makes the best studying outcomes. As such, SDT is not useful for schools that are concerned with the decline in students' motivation (Zimmerman 1985; Hidi 2000). For considering school work, it is reasonable and important to take Rheinberg's (2008) statement into account that the search for "truly intrinsic motivation" proves to be the pursuit of a phantom. It can be applied to the undermining effect and the continuum model. We need to consider common features or synergistic effects between intrinsic and extrinsic motivation, based on the features of school work and learning (Harter 2012; Hayamizu 1989; Hidi & Harackiewicz 2000; Lens et al. 2002; Raynor 1974a; Sansone & Morgan 1992). Deci and his colleagues (Deci 1975, 1992, 1998; Rigby et al. 1992) also considered the features or the effects, but their thought is not reflected clearly in their theory, such as the continuum model.

5. Prosocial self-realization as academic motivation

This study revealed that *the myth* is incorrect for adolescent school work by reviewing studies on interest and intrinsic motivation in SDT. An alternative concept of motivation that is specific to school work is needed, in lieu of *the myth* (Brophy 1983). For adolescents, it is prosocial self-realization.

Humans have the tendency (Rogers 1965) or need (Maslow 1970) to realize their own full potential and develop the self. By not being able to judge which is better, the tendency is used tentatively in this article. Self-realization is the same as self-expression in the sense that both involve expressing one's own ideas and drives (Maslow 1964). Self-expression not only taps into the self's potential but also contributes to the achievement of the valuable aims or goals for the self (Waterman 1990). As the tendency toward self-realization becomes stronger by gratification (Maslow 1962), it is enduring. Progress in self-expression itself evokes eudaimonia as self-contained reward (Waterman 1990). Moreover, it is significant for adolescent self-realization to be accompanied by prosociality.

Self-realization motivates the adolescent for school work. It is attained by regarding school work

as a means of prosocial self-realization, along with creating possible selves according to a future time perspective (FTP), based on egocentricity of learning. The process also includes the elements of seeking social roles as the other side of identity formation, setting goals as expressions of values, and self-regulating and delay of gratification to achieve goals.

5.1. Egocentricity of learning

The self affects cognitive information processing in various ways through referring to the self itself. Stimuli related to the self are recognized and retained better (a review by Heckhausen 1989). This phenomenon is called egocentricity of learning here.

Interest is a desirable type of egocentricity (in contrast, an undesirable one is confirmation bias). The relationship between interest and self-formation has been frequently mentioned (Renninger et al. 2002; Schiefele 1986). Dewey (1913) stated that interest is self-expression. As such, the self and learning are related interactively through interest (Hidi & Ainley 2002). The self includes self-concept as an object of recognition. The development of spatiotemporal and abstract cognition in adolescence fosters reflection on self-concept, which fosters the establishment of identity as a developmental task. In the reflection, possible selves as future self-images are the norm of evaluating and interpreting the present self as an object of the reflection; possible selves also associate the self with motivation, accomplished by giving a specific cognitive form to goals and plans (Markus & Nurius 1986; Raynor 1982 also expressed a similar idea).

A large part of critical decision-making in scenarios such as school work involves a process of imagining possible selves under numerous possibilities (Markus & Nurius 1986). In the process, an individual can imagine possible selves freely, but s/he is influenced by not only social-cultural and historical contexts but also representations from the media and his/her social experiences.

5.2. FTP

Possible selves are closely related to FTP (Leondari 2007), a part of time perspective, as a general concern for and corresponding consideration of the future (Kooij et al. 2018). Through the progress of time perspective, one can place one's own action into the structure of long-term means-ends and act toward further goals (Nuttin 1985). As in imagining possible selves, planning and acting toward further goals and cognitive development involved in time perspective influence each other (Lens 1986).

Adolescent time perspective has the following features: perceiving the past, present, and future integratedly, and being oriented toward the future (Tsuzuki 1999); being segmented by and focused in graduating from school or the events until getting a job and marriage as tasks in the transition to adulthood; giving importance to the present action to achieve future goals by recognizing means—ends (up to here Shirai 1997). In this way, adolescents develop their self-concept, including possible

selves with time perspective through not only intrapersonal factors, such as cognitive development, but also the process of career choices as the events forced by the social system (Tsuzuki 1999). Therefore, it is necessary for studies on academic motivation to take the students' ability for thinking of the future into account (Husman & Lens 1999).

Studies on FTP have examined the relationship between actions and achievement in school work. According to a meta-analysis by Andre et al. (2018), FTP is significantly correlated ($r = .24$) with academic outcomes, including attitudes, strategies, and records. Another meta-analysis, by Kooij et al. (2018), also showed a similar finding on records. However, these meta-analyses used various scales with different conceptualization (see Kooij et al. 2018). It is necessary to examine the construct validity of these scales. For example, the "future" sub-scale in the scale by Zimbardo and Boyd (1999) consists of items indicating a strict attitude of time. De Bilde et al. (2011), used by Andre et al., showed the sub-scale is closely correlated with not only academic achievement but also persistence and attitude of effective time management. Hence, the sub-scale indicates not FTP but diligence.

5.3. Instrumentality or utility

Regarding a present action as a means for achieving a goal, based on FTP, is the same as giving the action instrumentality. Instrumentality is to regard a present action as a means to (internal and/or external) reward in the (near or far) future. However, this definition is ambiguous. Studies on instrumentality tend not to consider the time, as Husman et al. (2004) mentioned. In other words, we should clarify whether instrumentality refers to the present or future life. Considering cognitive development related to FTP, the quality of instrumentality that an individual can recognize should differ by age (Eccles et al. 1998). It can be expected that the older a person is, the more and deeper they recognize instrumentality. Thus, the conclusion by Husman et al. is reasonable.

For reviewing the related studies, we need to examine the meaning of instrumentality. Quantitative studies that have not declared its meaning, such as those that do not state the items of the scale measuring instrumentality, have been excluded from this review. Studies that used a scale mixing instrumentality with other values, such as importance, are also excluded.

In reviewing the studies on instrumentality of school work for the future in adolescents, according to the aim of the present study, it is almost acknowledged that recognizing instrumentality is correlated with recognizing the importance of school work, academic motivation, study hours, use of successful learning strategies, and academic records (Destin & Oyserman 2010 surveyed junior high school students, Raynor 1968; De Volder & Lens 1982; Van Calster et al. 1987 surveyed high school students, Husman et al. 2004; Raynor 1970 surveyed university students). For example, Greene et al. (2004) surveyed the students in an English language class in a US high school. Instrumentality influenced the use of successful learning strategies directly and indirectly through mastery goals

(intentions to understand better and obtain mastery). The use of strategies influenced slightly the course records (the total score of test, projects, and homework).

Among the related studies, it is especially impressive that Simons et al. (2004) classified instrumentality into four types by the two perspectives of degree of instrumentality (immediate/future) and regulation (for internal/external reward). They surveyed students in a course in a nursing school in (probably) Belgium, ensuring that there were roughly an equal number of students in each type of instrumentality. The students characterized by the future instrumentality and internal reward type, namely, self-realization, demonstrated the best attitudes, such as motivation and interest; acted best, such as in study methods and time management; and earned the highest course grade, compared with the other types (including the immediate instrumentality and internal reward type, regarded as intrinsic motivation in SDT). Likewise, Lens et al. (2002) surveyed university students in a teacher pre-service education in (probably) Belgium, and reported similar findings. However, they did not state the details of the dependent variables they used. Tabachnick et al. (2008) also surveyed English major students of a US college. Regarding the tentative goal of graduation fostered the recognition of instrumentality for the study in the major. The recognition promoted using successful study strategies. In this process, intrinsic future goals (health, personal growth, affiliation, and community contribution) influenced positively to all these three elements, while extrinsic future goals (wealth, attractive image, and fame) did not involve the process. Therefore, in school work, instrumentality for the future self, instead of intrinsic motivation, motivates adolescents, encourages effort, and yields outcomes. Moreover, it is notable that the instrumentality is closely related to parameters of intrinsic motivation, such as interest and enjoyment (Husman et al. 2004; Miller et al. 1999; Sakurai 1995). Intrinsic motivation and instrumentality are not in contrast.

Instrumentality is roughly the same as utility in expectancy-value theory by Eccles and colleagues (e.g., Wigfield et al. 2017). The utility of school work means that what one studies in schools is utilized or applied for something, thereby implying the instrumentality of school work. Utility strongly predicted interest, effort, and outcomes in school work, too (reviews by Canning & Harackiewicz 2015 and Harackiewicz & Knogler 2017). Among the studies on utility, Brown et al. (2015) and Smith et al. (2015) suggested the importance of distinguishing between the selfish and the prosocial. Brown et al. (2015) conducted an intervention for students majoring in biomedicine of a (probably) US university. The students who recognized the prosocial utility of the major were motivated more to study the major, whereas those who recognized the selfish utility were not. Smith et al. (2015) studied a sample in a US women's university. The students' recognition of the prosocial utility of science fosters their identity formation in the field of science and their motivation for studying in the field. These findings suggest that adolescent recognition of the instrumentality of school work for the future self needs to feature prosociality.

5.4. Setting goals as expressing one's own values

Giving a present action instrumentality is the same as setting future goals/purposes. In adolescents, identity is formed through the process of identifying one's own purpose (Waterman 1990). The innate human tendency of searching for meaning (Maddi 1970) is involved in the process. Maddi (1970) stated that this search involves symbolizing, imagining, and judging (appreciating) objects. Thus, students not only understand the contents (knowledge and skills) but also appreciate the contents to know the desirable reasons for studying in school (Brophy 1999). In other words, knowledge is connected to self-image and creates a meaning of life through appreciation (Schiefele 1986).

Thus, this appreciation is the central process in self-formation, including setting goals and self-realization (e.g., Schiefele 2001 from the view of interest). Indeed, we persevere amid adversity with more initiative in activities that we think are related with ourselves than in those otherwise (Lydon & Zanna 1990). This finding echoes Maslow's (1970) statement that goals are essentially worth much for the self, and we do anything necessary to achieve these goals. This point is important when considering development through school work. According to the three stages in the theory of cognitive development by Whitehead (1929), humans acquire a routine through performing monotonic and boring tasks in the second stage of precision, laying aside learning freely by interest aroused at a previous stage. Sosniak (1985) proved this theory empirically by analyzing interviews with famous pianists and persons closest to them, such as their parents. Therefore, in the process of development through learning in school work, students cannot simply do what they like, and they do not always succeed and feel a sense of achievement (Covington 1999; Kage 1995). Students encounter struggles or difficulties (Rogers 1951) and must confront their fear of growth or knowing the self and the world (Maslow 1962). Hence, it is necessary and important that students are motivated enough to conquer such adversity.

The studies on expectancy-value theory have shown that appreciating school work positively, including recognizing instrumentality, influences the actions of taking a course and seeking academic achievements positively (reviews by Wigfield & Cambria 2010a, 2010b). Thus, positive appreciation evokes sufficient motivation to conquer pain or fear in learning. However, the reviews by Wigfield and Cambria, as well as the studies cited in these reviews, have tended to ignore the elements and structure of value. For example, they put importance, utility, favorability, and interest into a singular variable (e.g., Motivated Strategies for Learning Questionnaire by Duncan et al. 2015).

However, while utility can affect importance, the reverse is not logically unlikely. We need to examine what elements constitute the value for school work and how the elements are structured in the value. For this examination, it may be helpful for the values of school work to include the satisfaction of achieving understanding or mastering a skill under the attainment value, developing aesthetic appreciation of the content or skill under the intrinsic value, and gaining awareness of the

role of learning in improving the quality of one's life or making one a better person under the utility value, as Brophy (1999) stated. The following can be added to this list: religious or spiritual appreciation under intrinsic value and gaining awareness of the role of knowledge and skills in impacting social development under utility value. Moreover, recognizing the importance of school work seems to be formed through integrating the elements of value listed above. From the opposite view, we need to examine how the elements of value contribute to such recognition.

5.5. Seeking social roles as the other side of identity formation

Brown et al. (2015) and Smith et al. (2015) (see 5.3.) implied that adolescents are strongly motivated toward prosocial behavior (Damon et al. 2003). This concept is the other side of establishing identity as a main developmental task in adolescence.

Self-recognition stems from recognizing others in society (Hart & Damon 1988). Through this recognition of others, adolescents realize that others expect to assume responsibility for the welfare of society, particularly the people closest to them (Damon 1984). This expectation, associated with predisposition of caring for others and morality, such as retributive and distributive justice cultivated through playing with peers until childhood (Damon & Hart 1992), motivates adolescents to seek social contribution. Recognizing the self within society offers people the opportunity to integrate their own identity and intrinsic motivation with the social roles and demands that do not motivate us intrinsically (Ryan 1995; Ryan & Deci 2012). In adolescence, as testosterone increases, so, too, do the need for social status and reputation (a review by Yeager et al. 2017) and for actions emphasizing social fairness (Eisenegger et al. 2010). The latter fact is contrary to our stereotype that testosterone causes actions against fairness. The physiological features of adolescents may motivate them toward prosocial behaviors that create a better society.

5.6. Strengthening self-regulation for achieving goals

When students set goals and act toward them autonomously, they adjust their meta-cognitive, motivational, and behavioral (Zimmerman 1986) self-regulation (Garcia 1996; Baumeister & Vohs 2012). Zimmerman (1989) assumed the following three important elements in self-regulation: self-regulated learning strategies, self-efficacy perceptions of skill performance, and commitment to academic goals. Borkowski and Thorpe (1994) reported that possible selves are engaged functionally in setting goals and self-monitoring. According to Zimmerman and Pons (1986), high-achieving high school students use more categories of self-regulation strategies more frequently than their low-achieving peers. Thus, self-regulation is a factor that influences academic achievement. Indeed, students' appreciation of school work, including importance, utility, and interest, influences self-regulation strongly (Deci et al. 1994; a review by Hidi & Ainley 2008; Pintrich & De Groot 1990; a review by Pintrich & Zusho 2002; Sansone et al. 1992, 1999; Wolters & Rosenthal 2000).

Appreciation leads students to underestimate the cost of self-regulation and set a goal to learning that emphasizes the merits of self-regulation (Pintrich & Zusho 2002). Appreciation also leads to increased interest, which in turn leads to a higher ability to concentrate on immediate tasks and adjust one's self-regulation unconsciously (Lens et al. 2002). In this regard, the study by Yeager et al. (2014) is notable. University students who set an academic goal for social contribution (or who were induced to do so by an intervention) worked more on boring calculation tasks and avoided recreation compared with the students setting selfish goals. Yeager et al. (2014) concluded that these students can adjust self-regulation more effectively. This finding shows that prosocial self-realization motivates students more strongly to engage in school work.

5.7. Delay of gratification as FTP or self-regulation

Setting long-term goals and acting toward them through adjusting self-regulation are accompanied by delay of gratification (Wigfield et al. 2011), which means that delay of gratification (e.g., Mischel 2014) is related to FTP (see 5.2.) in terms of motivation (Lens 1986). Delaying gratification for acquiring capability is indispensable to learning, as Prenzel (1992) mentioned in terms of interest. As Raynor (1974b) stated, it takes a long time for people to acquire more valuable skills; through society offering appropriate rewards for people's efforts, delay of gratification is institutionalized in the social system. Society especially expects students in the school system to delay their gratification.

Indeed, Ryan and Connell (1989) examined the relation between the continuum model and school work in elementary school students and showed that enjoyment is more weakly correlated with identified regulation (abstract personal significance) compared with intrinsic regulation. In consideration of delay of gratification, this is reasonable and implies that enjoyment is not a parameter of a desirable state of motivation after all.

Meanwhile, both male and female university students feel less fulfilled compared with their other generations (Shirai 1997). One of the reasons may be that they are delaying their gratification to achieve their goals for establishing their identity or social independence both actively and passively, according to social expectation.

Bembenutty and Karabenick (1998) conceptualized academic delay of gratification, defining it as being engaged in school work by putting aside other activities from which one can obtain immediate gratification. It is correlated positively with intrinsic (challenge and curiosity) and extrinsic (pursuing better academic achievement) motivation, the use of many study strategies in self-regulation (Bembenutty & Karabenick 1998), and appreciation, such as importance, utility, interest, and favorability (Bembenutty 1999). These findings correspond with the previous discussion in the present study and Mischel's (2014) assertion that self-control for delay of gratification needs goals or values to lead life and strong enough motivation to conquer failure.

6. Vocational self-realization as prosocial self-realization

In summary, prosocial self-realization is the heart of academic motivation with respect to adolescents and their school work, and it encourages more excellent achievement compared with intrinsic motivation insisted by *the myth* and SDT. Prosocial self-realization can be paraphrased as vocational self-realization. Vocation indicates the display of one's individuality, actualization of social roles, and security of livelihood (Odaka 1953). It is the major means for people to achieve both self-realization and social contribution. Moreover, the transition from school to work is an important developmental task and a major matter of concern for adolescents, as mentioned above.

Indeed, according to a survey for university students by Amway (2017), students responded "do not want to work" lesser than 10% for a question on a desired line of job. In the survey by Mitsubishi Research Institute (2013), less than 6% of the respondents aged 15–24 years answered "do not want to work" to a question on motivation for jobs. Conversely, almost all adolescents include their future self-image of their vocation in their possible selves. The greater the concern is, the more cognitive resources are needed to solve the issues of their career decision-making. If the issues are resolved, such as when they decide their own career path, they can allot the needed cognitive resources for resolving issues in school work and may achieve better grades (Matsumoto 2013). Therefore, in considering adolescent academic motivation and achievement, it is significant to relate prosocial self-realization with vocation, that is, to take vocational self-realization into account.

7. Conclusions

Reviewing mainly psychological studies, this study revealed that with respect to academic motivation in adolescence, *the myth of intrinsic motivation* is not valid, as prosocial/vocational self-realization is the core of motivation. The hypothesis by Arai (1995), that motivation for school work turns to self-realization in between childhood and adolescence, and by Sakurai (2009, 2017), that self-realization as academic motivation includes the need for prosociality, and the author's claim are generally reasonable.

Interest is one of the factors for motivating learning and strongly important for school work. However, it is not the end-all for academic achievement, as *the myth* optimistically presents it to be. The reason is that the typical school curricula, subdivided to subjects and grades, is incompatible with the features of interest, which compels students to study a specific theme for a long time (Prenzel 1992). Moreover, interest narrows attention aggressively for the effective use of limited resources in the limited time of people's lives. Thus, the extent to which interest motivates students for school work is relatively narrow.

By contrast, self-realization holds interest at its core and motivates more broadly than interest

itself. For example, Hidi (2000) hypothesized that a student who wants to be a novelist is interested in not only studying English but also in expanding her learning, such as learning to use a computer to write a novel and discussing readers' impression with peers.

Moreover, *the myth* is invalid because of the three points below. First, *the myth* understands the adolescent psychological process of academic motivation inadequately and postulates simply and lightly that academic motivation is evoked by only achieving given tasks. A student's report cited by Frankl (1978) showed that many of the students who attempted suicide because of being troubled by the meaninglessness of life had good social relationships and academic records. Thus, adolescents are concerned with not only what they can do but also the meaning of what they do, by viewing themselves objectively and broadly in spatiotemporal sense. This concern is involved in the process of interest formation and decides how their own capacity is developed toward the future. As Eccles and Midgley (1989) stated, one of the reasons for the declining academic motivation in adolescence is the mismatch between the goals or psychological needs of adolescents and their educational environment. This mismatch includes educating or instructing only what students can do while putting aside the meaning of what they do, according to *the myth*.

Second, *the myth* emphasizes only interest in school work itself and looks down on the instrumentality of school work. However, interest and instrumentality are not in conflict. Studies on interest have shown that interest includes values such as instrumentality/utility. In the first place, forcing students to pursue only the interest of studying itself is not reasonable because school work is also an instrument in society. Even if school work is an instrument toward something, instructions or assessments in schools may be able to lead to students' use of successful studying methods and excellent achievement. Thus, schools, including teachers and administrators, should develop and promote such methods of desirable instructions or assessments. Many tasks remain toward achieving this aim.

Third, SDT by Deci and his colleagues, which reinforces *the myth*, is not appropriate for considering school work. Apart from the issue of its definition of intrinsic motivation, CET cannot be applied to school work because of its features. For one, the continuum model is not empirically supported and cannot be logically expected to be applicable to school work. Hence, *the myth* and SDT's understanding of adolescent academic motivation is superficial. In discussing motivation, we need to focus not on autonomy or enjoyment but on the students' goals that give school work instrumentality, as well as students' appreciation for school work that is associated with the goals, all of which form the base of autonomy or enjoyment. At the very least, instrumentality should be considered in terms of degree (immediate/future), type of regulation (for internal/external reward), and presence or absence of prosociality. By connecting the goals and appreciation with the tendency of self-realization, autonomy as self-regulation and eudaimonia are evoked.

Career education is based on the fact that vocational self-realization plays a central role in academic

motivation in adolescence. Based on this work, the next article, published in *Journal of Nagoya Gakuin University; HUMANITIES and NATURAL SCIENCES*, vol. 55, no. 2 and written in Japanese, argues on career education in Japan.

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