Predicting Self-Regulation through Inner Speech Reflexivity Modes

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Abstract

Archer (2012) theorized that internal conversation [inner speech] has a mediating role between *objective* or macroscopic features of social configuration and *subjective* mental [cognitive] activities. This mediating role is represented by communicative, meta-reflexivity, autonomous, and fractured modes. The literature review reveals that self-regulation may have originated in inner speech. However, it is unclear how different modes of inner speech/conversation can explain and predict self-regulation. To examine this question, 150 students completed measures of self-regulation and inner speech. Students reported lower levels of the *fractured mode* of inner speech than other modes. Although the meta-reflexivity mode (MRM) had the largest effect size in predicting self-regulation, communicative mode, self-consciousness, and MRM together predicted 41% of variability of self-regulation. As well, there were no differences in female and male participants' scores in inner speech reflexivity modes and self-regulation stages. The results suggest several implications to enhance students' self-regulation within the social context of educational settings.

Keywords

Self-Consciousness; Self-Regulation; Inner Speech Reflexivity Modes

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Introduction

Human thinking contains several latent cognitive mechanisms and processes such as directing (Vallotton, 2008), reasoning and planning (Heimpel, Qian, & Song, 2018; Morin, 2005, 2011), appraising and reappraising (Kraaij & Garnefski, 2019), controlling, inhibiting or delaying of gratification (Hadjicharalambous & Fanti, 2018; Santrock et al., 2005), and other cognitive strategies that are involved in constructing and developing self-regulation. Zimmerman (2000, cited in Sandars & Cleary, 2011) defined self-regulation as "self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals" (p. 14). This cognitive capacity refers to the active and constructive ability to manage personal emotions, thoughts, feelings, and wishes as well as activities to achieve desired outcomes and fulfil a variety of individual needs (Carey, Neal, & Collins, 2004; Corsini, 1999; Trommsdroff, 2009).

Such definitions reveal that a series of cognitive components characterize self-regulation by dealing with the compromise between personal emotions, thoughts, feelings, and social demands or coercion (Carey et al., 2004; Corsini, 1999; Sandars & Cleary, 2011). These components include appraising; reappraising; selecting alternatives; planning; monitoring progress; restraining desires, emotions, and tempting thoughts or impulses; maintaining activities to gain goals; and adapting to social demands (Baumeister et al., 2007; Chan, Shum, Toulopoulou, & Chen, 2008; Garnefski, & Kraaij, 2007, 2008; Saban, Ornoy, & Parush, 2014). All such mechanisms revolve around the axis of consciousness or awareness that motivates researchers to see self-regulation as a function of self-awareness (Morin, 2011). However, it is postulated that self-regulation is maintained through human language particularly inner speech (Cheyney, Wang, & Bettini, 2013; Vallotton, 2008).

Inner speech has been postulated as *self-talk* (Brinthaupt, Hein, & Kramer, 2009; Brinthaupt, 2019), *inner language* (Cheyney et al., 2013; Vallotton, 2008), and *internal conversation* (Archer, 2012, 2013). Considering both inner speech and internal conversation as self-talk, it is suggested that inner speech has a causal role in developing self-regulation in both women and men (Morin, 2011, Morin & Racy, 2015). Although some studies reported no gender differences in inner speech (Ren, Wang, & Jarrold, 2016), there were some differences across gender in both using inner speech and self-regulation strategies (Bashir & Bashir, 2016; Goubet & Chrysikou, 2019; Valletton & Ayoub, 2011). Goubet and Chrysikou (2019) argued that these differences are related to the frequency and the flexibility of using emotional regulation strategies indicating that women are more flexible and superior compared to men. Conducting a longitudinal study, Valloton and Ayoub (2011) reported some significant gender differences in both self-regulation trajectories and the impact of language on self-regulation in early development.

Regardless of such gender differences, the role of inner speech in developing self-regulation was implied by Vygotsky (Bodrova, 2014) when he emphasized that children use the process of internalization through language to develop from *co-regulating behavior* with an adult to behave *independently*. This development occurs within the *zone of proximal development*, which is the growing edge of competence representing a set of skills a child needs to learn (Florez, 2011). To reach this level of development, individuals use inner speech as self-directed thought. Accordingly, inner speech may be considered as an agent that performs cognitive processes to generate meanings, internalize concepts (Margolis & Laurence, 2011), interpret external situations, adapt to situations, and change external situations socially and developmentally (Cheyney et al., 2013).

For Archer (2012), inner speech (or internal conversation), as self-talk, has a mediating role between the *objective* or macroscopic feature of social configuration and *subjective* mental

(cognitive) activities. Margaret Archer is a British sociologist who developed a social morphogenetic approach to find a solution for the problem of "structure and agency." She claimed that individuals have power to monitor, change or develop their social stances and situations by virtue of inner conversation [inner speech] about their personal or social concerns, ideas, values, and behaviors. For individuals, this is an "exercise of the mental ability to consider themselves (their concerns) in relation to their social contexts and vice versa" (Archer, 2012, p. 1). Although Archer did not focus on self-regulation as a product of inner speech, she theorizes that through this exercise (internal conversation), individuals are involved in some processes at both *cognitive* and *societal* levels by which concepts and context-based meanings are proliferated and then provide an opportunity to produce different modes or styles of inner speech in social context.

At the *cognitive level*, inner speech [internal conversation – Archer, 2007, 2012] is involved in a set of cognitive mechanisms and processes that determine thoughts. Some of these processes may include receiving, defining, coding, classifying, discriminating, evaluating or appraising, screening, planning, adaptation, searching, formulating, implementing, and reassessing (Baumeister et al., 2007; Chan et al., 2008; Garnefski et al., 2007; Garnefski, Grol, Kraaij, & Hamming, 2008; Miller & Brown, 1991; Saban et al., 2014). Evidence-based findings demonstrated that such processes emerge and act through the rehearsal of inner speech (Malim, 1989; Morin, 2011; Morin & Uttl, 2013).

At the *social level*, Archer (2007, 2012) argued that this rehearsal occurs within social contexts and, since individuals develop within social contexts, the products of inner speech are socially contextual and constructed. The role of social context is to activate the above-noted processes and to develop different modes of inner speech (Archer, 2003, 2007, 2012). Accordingly, each single process of thought is a result of the interplay between cognitive levels and social levels (Archer, 2007, 2012). Through this interplay, norms are learned and internalized, and four different modes of inner speech develop.

The *communicative mode* refers to a type of "internal conversations that need to be confirmed and completed by others before they lead to action" (Archer, 2012 p. 13). This mode may strengthen social integration, and it may be used by people who tend to maintain contextual continuity strongly (Clarke, 2008). With this mode of inner speech, people seek similarities among the population and across situations. Although this mode can establish and maintain peoples' identities (social identity), it may create strong resistance against any possible changes.

Autonomous reflexivity refers to a type of inner speech that is "self-contained and leading directly to action" (Archer, 2012, p. 13). Clarke (2008) argued that goal-achievement is a major characteristic of autonomous reflexivity. This mode is characterized by relying on internal resources, self-directed decision making, taking an independent course of action, relying on individual concerns, promoting contextual discontinuity, transforming behavior into action through voluntary conduct, and self-autonomy (Clarke, 2008; Colombo, 2011).

Meta-reflexivity is another mode that is characterized by self-critique and societal critique (Clarke, 2008). Archer (2012) elaborates features of meta-reflexivity including searching for personal and social reality, being satisfied with this searching, critically considering future plans or projects, trying to make a project feasible in the external world, and being critical about effective actions in a society. In addition to these modes of reflexivity, the *fractured mode* is characterized by focusing on personal distress and disorientation and the lack of purposeful

courses of action. Passive agent is another name that some researchers use to refer to this mode (Clarke, 2008; Colombo, 2011).

Devoting attention to inner speech reflexivity modes and self-regulation is important in educational contexts. For example, King and Kitchener's (2004) reflective judgment model focuses on how educational experiences can facilitate the development of reflective thinking and informed decision-making. The role of self-regulation in educational settings is well-established (e.g., Greene, 2018). In addition to their relevance to student development and outcomes, inner speech and self-regulation are also important for teacher preparation programs (e.g., Hofer, 2017). Thus, examining the relations among inner speech modes and self-regulatory tendencies can provide us with interesting implications for educational and other kinds of behavioral interventions.

In summary, comparing the cognitive mechanisms of self-regulation (Carver, Johnson, & Joormann, 2009; Legault & Inzlicht, 2013; Trommsdorff, 2009) with the features of the inner speech (internal conversation) modes in Archer's theory reveals that there are several common cognitive processes (Shahidi, 2015). For example, the meta-reflexivity mode may be seen in self-regulated individuals (Neal & Carey, 2004, 2005), and this mode also deals with self-improvement, self-realization, and self-awareness (Vandenberghe, 2003) that may have close association with self-regulation. However, it is not clear whether such inner speech modes can explain self-regulation. Also, since people use different levels of modes in different situations (Archer, 2012), it is unclear how these modes predict self-regulation. Accordingly, the present study examined the following hypotheses.

1: Inner speech reflexivity modes will be positively related to self-regulation stages.

2: There will be some differences among the inner speech reflexivity modes and self-regulation stages in terms of gender.

3: Inner speech reflexivity modes have positive roles in predicting self-regulation.

1. Method

1.1 Participants

After collecting and cleaning the data from 165 participants attending undergraduate programs including Psychology, Arabic Literature, Computer Engineering, and Art at Islamic Azad University, Tehran Central Branch (IAU-CTB), 150 surveys were used in the study. Fifteen participants were removed because they did not respond to some parts of the survey. Mean age of all participants was 25.21 years (SD = 5.7). Of the overall sample, 101 (67.3%) students were single and 49 (32.7%) were married; 123 (82%) individuals were female and 27 (18%) were male. The proportional discrepancy between female and male students in Iranian universities reflects women's cultural preferences and university admission policies by which the number of female students are more than male students (Rezai-Rashti, 2012; World Bank Middle East and North Africa Social and Economic Development Group, 2009). Students agreed to participate in the study after reading an informed consent form.

1.2 Instruments

Self-Regulation Questionnaire (SRQ)*:* To assess self-regulation, the 63-item questionnaire developed by Miller and Brown (1991, Brown, 1998; Neal & Carey, 2005) was used. The questionnaire has seven subscales and each of them contains nine items to assess a specific stage of self-regulation (Neal & Carey, 2005). The stages include receiving information or informational input, self-evaluation, triggering to change by the perception of discrepancy, searching for more options, formulating a plan, implementing the selected plan, and assessing the plan's productiveness (Neal & Carey, 2004; Neal & Carey, 2005). These stages were postulated by Miller and Brown (1991) based on Kanfer's works on self-regulation (1970a, 1970b; Karoly & Kanfer, 2003; Neal & Carey, 2005). Individuals display their capacity of self-regulation (through using these stages) in three sequential categories including a) high (intact), b) intermediate (moderate), and c) low (impaired) self-regulation capacity (Kanfer, 1970a, 1970b; Karoly & Kanfer, 2003; Miller, & Brown, 1991; Neal & Carey, 2005). High test-retest reliability for the total SRQ score (r = .94, p < .0001) as well as high internal consistency (α = .91) was reported previously (Aubrey, Brown, & Miller, 1994; Gavora, Jakesova, & Kalenda, 2015). Gavora et al. (2015) used SRQ in 360 Czech university students and reported an acceptable Cronbach's alpha .88 for total score of SRQ. In the current research, internal consistency was good, α = 0.90. All subtests showed acceptable reliability values between 0.64 and 0. 87 (see Table 2).

The Inner Speech Reflexivity Scale (ISRS): ISRS was developed in Persian by the first author based on Archer's (2012) theory of reflexivity in Persian. The first version of ISRS consisted of 39 items rated using a frequency format (0 = *never*, 1 = *occasionally*, 2 = *a moderate amount*, 3 = *a great deal*). The total score of each subscale was calculated by summing scores of the items for each mode. Of the total items in the first version of the ISRS, 32 items measured four modes of inner speech and 7 items measured self-consciousness. After an exploratory factor analysis, five items were removed, leaving 34 items that explained 46.8% of the variance of four modes of inner speech and self-consciousness.

Of the 34 items, six items measured the communicative mode (e.g., *When I talk to myself, I prefer to conform my thoughts to what others believe*), nine items measured the autonomous mode (e.g., *When I talk to myself, I feel to be independent in my thoughts*), seven items measured the meta-reflexivity mode (e.g., *When I talk to myself, I criticize my ideas*), and six items measured the fractured mode (e.g., *When I talk to myself, I realize that my thoughts are not consistent*). The subscale of self-consciousness contains six items measuring the extent to which participants were conscious and purposeful through their rehearsals of inner speech (e.g., *When I talk to myself, I am conscious of my thoughts*). The self-consciousness subscale was included in this questionnaire to examine the degree to which students are conscious during their engagement in the inner speech reflexivity modes.

The total score of the scale reveals the degree to which students are engaged in all different kinds of inner speech reflexivity. Measuring Cronbach's Alpha revealed that all subscales had acceptable internal consistency between .72 and .80. Table 1 also shows that the associations between subscales were low enough indicating each component is a unique and distinct factor with no significant overlap.

Table 1: Correlations among Subscales of Inner Speech Reflexivity Scale

	Modes of Inner Speech	2	3	4	5	6
1	Total Score of ISRS	.65**	.58**	.61**	.60**	.72**
2	Communicative Mode	1	.14	.19*	.29**	.19*
3	Meta Reflexivity Mode		1	.20*	.29**	.37**
4	Autonomous Mode			1	.25**	.34**
5	Fractured Mode				1	.33**
6	Self-Consciousness					1

Note. N = *150; *p < 0.05, **p < 0.01.*

In a pilot study with 45 students who were selected from the same population of IAU-CTB, we examined the convergent validity of ISRS through using the Persian versions of Self-Talk Scale (STS- Khodayarifard, Brinthaupt, Zardkhaneh, & Ebadi Fard Azar, 2004) and the Varieties of Inner Speech Questionnaire (VISQ) that was developed by McCarthy-Jones and Fernyhough (2011). Those participants were from different disciplines who enrolled in one general course and answered to all three questionnaires in one session of their class time. Results showed that the association between ISRS and STS total scores was .78, and between ISRS and VISQ total scores was .82, indicating acceptable convergent validity for the ISRS.

Students' Demographic Questionnaire (SDQ): The SDQ consisted of 20 questions measuring the fundamental social characteristics of participants such as age, marital status, educational discipline, gender, and other demographic variables.

1.3 Results

After calculating the descriptive statistical indexes (Table 2), the first hypothesis was analyzed using the correlations between diverse modes of inner speech and self-regulation stages (Table 3). As Table 3 shows, there were weak associations between the autonomous mode and self-regulation, but the other modes revealed significant correlations with most of the self-regulatory stages. It was noteworthy that, whereas the communicative mode related negatively to self-regulatory tendencies, the other modes were positively associated with self-regulation scores. It is also clear that the meta-reflexivity mode related most strongly to self-regulation.

Table 2: Descriptive Indexes for Subscales of ISRS and Self-Regulation

Modes of ISRS and SR	Number of Items	Mean	SD	95% Confidence Interval
Communicative	6	11.57	3.85	10.95 – 12.02
Meta Reflexivity	7	8.92	2.37	8.54 – 9.31
Autonomous	9	9.27	2.7	8.84 – 9.71
Fractured	6	4.24	1.41	4.02 – 4.47
Self-Consciousness	6	13.66	3.33	13.12 – 14.20
Total Score ISRS	34	47.68	8.77	46.26 – 49.10
Total SRQ Score	63	218	27.01	213.71 – 222.42
Receiving Stage	9	31.7	4.81	30.92 – 32.27
Evaluating Stage	9	29.98	4.58	29.25 – 30.73
Triggering Stage	9	30.27	4.2	29.60 – 30.95
Searching Stage	9	32.35	5.71	31.42 – 33.27
Planning Stage	9	30.11	4.56	29.45 – 30. 92
Implementing Stage	9	30.57	5.13	29.75 – 31.40
Assessing Stage	9	32.20	5.17	31.35 – 33.02

Note. N = 150; ISRS = Inner Speech Reflexivity Scale; SRQ = Self-Regulation Questionnaire; SD = Standard Deviation.

Table 3: Correlations among Inner Speech Reflexivity Modes and Self-Regulation Stages

Self-Regulation Stages	Inner Speech Reflexivity Modes				
	Communicative	Meta Reflexivity	Autonomous	Fractured	Self-Consciousness
Receiving	-.14	.56**	.06	.22**	.25**
Evaluating	-.21*	.35**	.16*	.14	.29**
Triggering	-.13	.36**	.16*	.22*	.31**
Searching	-21*	.40**	.11	.14	.29**
Planning	-.05	.35**	-.01	.26**	.15
Implementing	-.20*	.44**	.03	.19*	.26**
Assessing	-.15	.38**	.08	.18*	.33**
Total Self-Regulation Score	-.19*	.53**	.12	.26**	.33**

Note. $N = 150$; $*p < 0.05$; $**p < 0.01$.

We used independent samples *t*-tests to examine the differences between females' and males' scores on both self-regulation and inner speech reflexivity measures. These analyses did not show any differences among the scores of self-regulation stages and inner speech reflexivity modes in terms of gender. Thus, there was not support for the second hypothesis.

Regarding the third hypothesis, stepwise multiple linear regression was used to control overlapping among the variables and to extract the possible models in predicting self-regulation by means of inner speech modes. This method extracted four models for explaining the effect sizes of inner speech modes in predicting SR (Table 4).

As the results show, Model 1 included only the meta-reflexivity mode (MRM) of inner speech, indicating that this model could explain 28% of the variability in self-regulation. Model 2 included MRM and the communicative mode (CM) and accounted for 35% of the variability in self-regulation. Model 3 contained MRM, CM, and self-consciousness (SC) explaining 38% of the variability in self-regulation. Model 4 demonstrated that four factors including MRM, CM,

SC and the fractured mode (FM) of inner speech explained 41% of the variability in self-regulation.

Table 4: Results of stepwise multiple regression in predicting self-regulation through modes of inner speech

Models	Predictors (Modes of Inner Speech)		U-Beta	S-Beta	R	R^2	F**	df	R Square Change
Model 1	Constant	164.5							
	Meta Reflexivity Mode		6.0	0.53	.53**	0.28	56.63	(1,148)	0.28
Model 2	Constant	182.34							
	Meta Reflexivity Mode		6.44	0.56					
					.59**	0.35	39.15	(2, 147)	0.07
	Communicative Mode		-1.88	-0.27					
Model 3	Constant	169.24							
	Meta Reflexivity Mode		5.61	0.49					
	Communicative Mode		-2.08	-0.30	.62**	0.38	30.28	(3, 146)	0.04
	Self-Consciousness		1.67	0.21					
Model 4	Constant	165.92							
	Meta Reflexivity Mode		5.28	0.46					
	Communicative Mode		-2.33	-0.33					
	Self-Consciousness		1.38	0.17	.64*	0.41	24.68	(4, 145)	0.02
	Fractured Mode		3.12	0.16					

Note. N =150; ** $p < 0.000$; * $p < 0.05$

Table 5: Results of multiple regression in predicting self-regulation through overall inner speech reflexivity modes of ISR

Predictors: ISRM*	Constant	U-Beta	S-Beta	R	R^2	F	df	R Square Change
	173.99			.62	.38	22.46*	(4-145)	.38
Communicative		-2.26	-.32					
Meta Reflexivity		5.82	.51					
Autonomous		.25	.02					
Fractured		3.75	.19					

Note. N = 150; * $p < .000$.

Removing the component of self-consciousness from the regression equation, we examined the degree to which all different modes together may predict self-regulation. Thus, the predictors were entered into the equation of regression through "enter method". The results (Table 5) indicated that the overall modes could predict 38% variability of self-regulation without the component of self-consciousness.

Discussion

Archer (2012) postulated that inner speech (internal conversation) has different modes. Using these modes provides people with different social configurations and ways to compromise between personal concerns and social demands. Although recent research examines the general relationships among inner speech, consciousness, self-awareness, self-regulation, and other cognitive processes (e.g., Bodrova, 2014; Bramucci, 2013; Florez, 2011; Morin, 2005, 2011;

Perrone-Bertolottia, Rapin, Lachaux, Baciua, & Loevenbruck, 2014; Vallotton, 2008), the literature lacks empirical studies about the relationships between Archer's modes and self-regulation; hence, the current research is the first study about the relationship between ISRS based on Archer's view and self-regulation. Focusing on how such modes might help to explain and predict self-regulation, the results revealed that participants used the fractured mode of inner speech less often than other modes of inner speech. This indicated that the participants were focused less on their personal distress and disorientation than other features of their inner speech.

The communicative mode (CM) of inner speech showed a negative correlation with self-regulation. This result aligns with the characteristics of the communicative mode in Archer's (2013) views. People with this mode try to show social conformity (Clarke, 2008) rather than actively present a critique of the social status quo. Alternatively, self-regulated people tend to take a proactive role in shaping social situations through self and social regulation (Bandura, 1999).

Opposite of the communicative mode, the meta-reflexivity mode (MRM) of inner speech showed higher correlations with all stages of self-regulation in students. That is, the more use of the meta-reflexivity mode, the higher levels of self-regulation. Also, MRM had the largest effect size in predicting self-regulation; that is, MRM explained almost 30% of the variability in self-regulation. This finding suggests that there may be some common cognitive processes (such as assessing or appraising, reappraising, planning, monitoring progress; maintaining activities to gain goals; and others) that underpin both MRM and self-regulation.

Moreover, MRM, CM, and self-consciousness together predicted 41% of the variability in self-regulation. These results supported previous research in which other features of inner speech have shown a relationship with self-regulation (Alderson-Day & Fernyhough, 2015). This research provides an avenue for exploring different patterns of inner speech through psychosocial theories. For example, although previous studies recommended working on all types of inner speech in educational settings to improve students' sense of agency (Shahidi, 2015), the current research suggests that MRM might be more central than other inner speech modes to reflect individuals' self-regulation. This mode deals with the self-critique, apprising, assessing, and reassessing that are influential in constructing self-regulation.

Any intervention program to enhance and develop self-regulation may concentrate on the above-noted modes of inner speech particularly MRM, CM, and SC. Teacher preparation programs should also focus on reflection and reflexivity (e.g., Hofer, 2017; King & Kitchener, 2004). Our results suggest that attention to inner speech modes would be beneficial for such programs. The result of the second hypothesis showed that there are no gender differences in participants' scores on self-regulation and inner speech measures. This result was in line of Ren et al.'s (2016) research suggesting that working on these modes to enhance students' self-regulation should be equally planned in both female and male students.

There are other interesting implications of the present findings. In particular, whereas we drew the current sample from the Middle East, the relations among inner speech modes and self-regulation may differ depending on cultural context. Future research should explore these variables in other cultures (such as Asia or Central-Eastern Europe), given Archer's (2012) argument that inner speech reflexivity modes develop in social-historical contexts. The present sample was also college-age, so it is not clear whether the relationships among the variables studied will differ for younger or older participants. For example, Perkowska-Klejman and

Odrowaz-Coates (2019) found that older (doctoral) students reported higher levels of critical reflexive thinking compared to younger (undergraduate) students.

Conclusion

In this paper we attempted to portray the predictive role of inner speech reflexivity modes in self-regulation. Since inner speech reflexivity modes happen and develop in socio-historical contexts (Archer, 2012) and because the educational system is a major organized socio-cultural and historical context, improving students' self-regulation through inner speech (reflexivity) modes should be considered contextually as a long-term plan in an educational system. This research provided some important findings suggesting that psychologists and educators focus on the modes of inner speech reflexivity in their intervention programs contextually. Working on these modes can help students and teachers to regulate and prioritize their concerns in relation to different contexts (social situations). However, we faced some limitations in this research. The results of the current study are not fully generalizable to all university students as participants were convenience sampled. Although attempts were made to include students across gender and academic programs, the number of female and male participants was not equal. Thus, the result of second hypothesis should be interpreted cautiously. Further studies can examine gender differences through using a more balanced sample. As well, future research can focus on the common and unique cognitive processes that underpin both MRM and self-regulation cross-culturally.

Conflict of interest

Authors declare no conflict of interest.

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