Exploring the Relationships among Metalearning, Cognitive Holding Power and English Writing Skills of Pre-service Teachers in Egypt

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ABSTRACT

Although there are a number of studies on English writing skills, the relation among metalearning, cognitive holding power and writing skills is not well understood. Thus, this study investigated the relation among metalearning capacity (high versus low) and cognitive holding power (CHP; first-order versus second-order) in explaining the English Language writing skills of Egyptian pre-service teachers. We constructed and validated new measures of metalearning and English writing skills, and adapted an existing measure of CHP for use with our Egyptian sample. Participants with high metalearning capacity demonstrated better writing skills than those with low metalearning capacity. In addition, participants with second-order CHP exhibited better writing skills than those with first-order CHP. The two factors made independent contributions (i.e., did not interact) because, we argue that metalearning operates at the level of the individual learner whereas CHP is an attribute of the larger instructional environment (as orchestrated by the teacher). These findings generalize and extend our current understanding of the role of metalearning and CHP in developing writing skills to a new population, and establish the utility of newly developed and adapted instruments and adapted instruments. They also set the stage for future interventions for developing better English writing skills in pre-service teachers.

1. Introduction

The four language skills– listening, speaking, reading and writing – cannot be acquired through rote learning. Rather, learners must be independent to master the multiple requisite knowledge sources, and must show initiative in applying this knowledge to real life situations. A number of constructs from cognitive and educational psychology are clearly relevant, including metacognition, metamood, metacomprehension, metamemory, self-regulated learning, *metalearning* and *cognitive holding power* (Aksöz, Bugay, & Erdur-Baker, 2010; Biggs, 1987; Fernandez-Berrocal, Extremerra, & Ramos, 2004; Fredrikson & Hoskins, 2007; Meyer & Shanhan, 2004; Pintrich, Wolters, & Baxter, 2000; Sperling, Howard, Staley, & DuBois, 2004, Stevenson, 1998). However, relatively little is known about the relation between the latter two concepts, metalearning and cognitive holding power, and the development of writing skills. Here, we consider this question in a cross-cultural context, with a sample of Egyptian pre-service teachers majoring in English.

2. Literature Review

2.1 Metalearning

A number of definitions of metalearning have been proposed in the literature. Biggs (1987: 75) first introduced this term and defined it as the process by which learners become aware of and exert control over their own learning. In this view, metalearning is a bi-dimensional concept that consists of *awareness* and *control*. Echoing part of this definition, Jackson (2003) emphasizes the learner's ability to be in control of his learning.

Metalearning has also been equated with the *metacognitive* processes relevant for *learning* and studying that help learners be aware of better strategies for specific educational situations, an awareness that is necessary for achieving the best outcomes in learning, for example, English language skills. Focusing on the metacognitive dimension, metalearning can also be defined as a critical, reflective and self–evaluative process that enables the learner to be aware of his or her needs and the problems he or she encounters to achieve learning outcomes (Wisker, Robinson, Trafford, Lilly, & Warnes, 2004). Focusing on the learning dimension, Watkins, Carnell, Lodge, Wagner, and Whalley (2001) define metalearning as learning about learning. Norton, Owens, and Clark (2004) combine both metacognition and learning in their definition of metalearning as the process by which the learner monitors his learning process and consequently relates it to his mental abilities.

Jackson (2003, 2004), in reviewing and summarizing multiple definitions of metalearning, proposes that it is a *multidimensional construct*: it is a product (cognition), a process (a thinking method related to new ways for learning), and an attitude (a way of engaging learning situations). Robinson (2007) described metalearning as consisting of five dimensions: metaconative (motivation), metacognitive (thinking), meta-affective (feeling), metaspiritual (inspiration) and meta-kinesthetic (body connection). In this view/sense, metalearning includes being aware of the effect of awareness, control, thinking, motivation, feeling and inspiration on language learning outcomes.

A number of studies have found that metalearning has a positive effect on student learning outcomes, i.e., it is highly related to achievement. For instance, Watkins et al. (2001) concluded that metalearning is more related to possessing a *learning-orientation*

than a *performance-orientation.* Students who are learning-oriented have a wide range of learning strategies and employ them effectively and appropriately given the nature of learning tasks. In other words, students who engage in metalearning educational activities become more aware of selecting better learning strategies for their learning.

Metalearning is also related to *deep approaches* to learning. Evans, Riby, and Fibiger (2003) described students with deep approaches to learning as concentrating fully on the learning task and relating the new learned information to their prior knowledge, resulting in integrated information. Furthermore, Wisker et al. (2004) argued that metalearning is associated with expert learners in that it enables them to be aware of different learning strategies and how they fit (or do not fit) the intended learning outcomes. Carneiiro (2007) argued that metalearning helps learners organize different sources of information, a requirement for effective learning.

To summarize, there is broad support in the literature that metalearning is important for successful study. By contrast, a smaller number of studies have investigated the relation between metalearning and writing skills. Robinson (2007) found that metalearning is highly related to the creative writing skills of students. Ward and Meyer (2010) investigated metalearning in the United Kingdom among Commerce students via their written profiles. They found that the profiles of students with high metalearning capacity were better organized than those of students with low metalearning capacity, consistent with Carneiiro (2007). Wisker et al. (2004) studied metalearning in doctoral students, which is presumably important for conducting independent research. The results indicated that those who benefited more from metalearning training were able to finish their dissertations earlier than those who benefitted less. This small number of studies suggests that metalearning may be important for writing skills. However, the question of whether metalearning is important for developing English writing skills in non-native people remains open.

2.2 Cognitive Holding Power

Learning does not occur in a vacuum; learning environments have a great effect on students' learning outcomes. A number of studies have investigated the characteristics of supportive learning environments, the cognitive structures, cognitive representations, and learning styles, learning approaches they support (Blasing, Tenebaum, & Schock, 2009; Dincer, Yesilyurt, & Takkac, 2012; Psaltou-Joycey & Kantaridou, 2011; Richardson, 2011; Stevenson & Evan, 1994). In addition, Stevenson, Mckavagh, and Evans (1994) argued that learning environments *press* learners to engage in different levels of thinking and cognitive activities, which they call *cognitive holding power* (CHP).

Stevenson and Evans (1994) defined two types of press that learning environments exert on students: to engage in *first-order* or *second-order* cognitive procedures. First-order CHP is defined as pressing students to engage in specific routine procedures. Second-order CHP is defined as pressing students to use open-ended, non-routine procedures such as problem solving and interpretation of new situations. First-order CHP presses learners to be inactive learners or instructions executors; it is teacher-led. By contrast, Second-order CHP encourages students to be active learners, responsible for their own learning, and to be problem-solvers and "information-producers"; it is student-centered.

Walmesly (2003) argued that CHP is related to whether learning environments

produce positive or negative learning outcomes. Different learning environments press students to engage in different types of cognitive activities (Xin, 2008) and to utilize different levels of procedural knowledge (Xin & Zhang, 2009).

Stevenson and Evans (1994) described the different characteristics of first- and second-order CHP (see Table 1). Generally speaking, first-order CHP is related to simple outcomes that only require following instructions and lower levels of thinking and effort. By contrast, second-order CHP is related to complex outcomes that require higher levels of thinking and effort: experimentation, problem solving, and so on. As this distinction makes clear, it is vitally important to study second-order CHP.

A number of studies have found that second-order CHP has a positive effect on student learning outcomes. Stevenson and McKavagh (1991) argued that it is more important for "practical" classes than for "theoretical" classes because the former require students to engage in active learning: to be energetic, to show initiative and to be interactive. Stevenson et al. (1994) investigated the relation between study experiences and teachers' actions on CHP in practical classes in Australia. They found a positive relation between first-order CHP and teachers' initiation, and second-order CHP and students' initiation and cooperative work. More recent research has found that the benefits of second-order CHP learning environments are not limited to practical classes, and extend also to theoretical classes. For example, Xin (2008) found that second-order CHP is a better predictor of math performance than first-order CHP.

To summarize, learners with second-order CHP show more initiative, and are more interactive and problem solvers than those with first-order CHP. This has been shown for practical subjects and for mathematics. However, the question of whether learning environments should have high levels of second-order CHP for developing English Language writing skills remains open.

2.3 Writing Skills

In Egypt, English is taught as a foreign language (FL). Writing is a particularly important language skill when there is no direct contact between native and non-native speakers. We propose that second-order CHP facilitates mastery of foreign language skills. Consistent with this proposal, Pu (2009) suggested that learners should be independent when learning FL – that is, they should display second-order CHP. They should also display metalearning, selecting the best strategy for planning and controlling their learning, a point we return to below.

Researchers have proposed different definitions of writing skills in English. Jeffery and Archibald (2000) defined writing skill as a compound activity and a multifaceted skill requiring proficiency in many other skills. Learners' views about writing and the required cognitive processes involved vary at different stages (Scheuer, Cruz, Pozo, Hurd, & Solo, 2006). Writing skill can also be defined as written expression about feelings and ideas that requires practice and deduction (Kirmiz, 2009). Gowda (2010: 139) emphasized that writing is a mean of effective communication and meaning exploration of individuals. Writing skill can be defined more pragmatically, as a means of linguistic communication by which we identify others' attitudes, opinions and feelings.

Numerous researchers have asserted the importance of writing skills in English and emphasized their role in mastering the other language skills: listening, speaking, and reading (Peuteh, Rahamat, & Karim, 2010).

For this reason, there has been a special emphasis on the factors affecting leaning and teaching writing skills. For instance, Moustafa (2002) stated that writing plays an effective role in our personal and professional life as it is a continuous process of conveying ideas and feelings of people. Writing is important for learning scientific skills: students with better writing skills were better able to learn scientific concepts than students with worse writing skills (Klein, Crmini, & Williams, 2007).

Kirkpatrick and Klein (2009) noted that writing is integral to all of education. Not surprisingly, many researchers have developed programs for fostering writing skills in different grade levels and across different cultures (Abdel Gawad, 2003; Abdel Hai, 2009; Isisag, 2010; Jackson, 2005; Jalaluddin, Yunus, & Yamat, 2011; Jones, Reutzel, & Frago, 2010; Mohammed, 2000; Kutlu, 2013; Paz & Felton, 2010; Pirtchard & Nasr, 2004; White & Bruning, 2005).

Of particular relevance to the current study are studies investigating writing skill assessment standards in English for pre-service teachers. Fox and Allen (1983: 231-232) noted that writing skills assessment standards include organization, coherence, accuracy of selecting words and expressions, audience, format, punctuation, spelling, and revision. McDonough and Shaw (1993: 186) additionally include structure, grammar, content and purpose. Henry (2008: 16) argued that writing standards should also cover topic, purpose and audience.

With regard to assessing writing skills, some researchers have proposed that we can assess writing skills objectively via performance-based assessment, portfolio, rubrics, computer-based assessment and curriculum-based measures (Beyreli & Ari, 2009; Horn, 2009). For example, Romeo (2008) proposed that skillful writers use their knowledge to write organized content, and plan their writing; they use writing strategies effectively; they care about ideas of writing an about feedback; they proofread and assess their writing continuously; and they write independently. In other words, they approach writing as a process (drafting, writing and proofreading) rather than a product. The process approach focuses on the role of students in the different stages of writing and on their active participation in the writing process (second-order CHP). By contrast, the product approach focuses on the role of teachers in the final product of writing and casts students only as receivers of information – this is (first-order CHP).

3. The Current Study

Most of the studies of metalearning, cognitive holding power and writing skills reviewed above were conducted in different countries such as Libya and Japan. No prior study has investigated the *relation* between metalearning, cognitive holding power and the writing skills, and no study has focused on Egyptian pre-service teachers majoring in English. The current study fills these gaps. Its purpose is to investigate whether individual differences in the English writing skills of this population are driven by differences in metalearning capacity (high vs. low), differences in CHP (first-order CHP vs. second-order CHP), or some combination of these factors.

3.1 Participants

The participants were 134 fourth-year undergraduate students (44 male, 90 female) drawn from the Qena, Aswan, and Sohag Faculties of Education, South Valley University, Egypt. The mean age was 20.80 years (SD = 0.45 years, range = 20-22 years). All participants took part in the study voluntarily.

3.2 Measures

3.2.1 Metalearning Scale

We developed a new metalearning scale based on the theories of this construct reviewed above. It consists of five subscales totaling 68 items: 15 for awareness (e.g., *I overview the content of a text to be aware of the points included.*), 11 for control (e.g., *I review my writing regularly to make sure of the points covered.*), 17 for metacognition (e.g., *I ask myself different questions while writing an essay.*), 16 for meta motivation: being aware of the role of motivation, e.g., *Motivation is important to write difficult essays.*) and 9 for meta-affective: the role of feelings in writing, e.g., *My feelings affects me in writing an essay.*). Each item was a statement that participants rated on a 5-point Likert scale ranging from "totally applicable for me" to "totally inapplicable for me". Item and scale psychometrics were calculated. With respect to reliability, the reliability coefficient (Cronbach's alpha) for the subscales and the total scale ranged from 0.673 to 0.897. With respect to validity, criterion related validity was calculated using an Arabic version of Biggs surface and deep approaches of learning questionnaire. The correlation coefficient was 0.883, which was significant at the .01 level. The inter correlations among the subscales, which indexes their homogeneity, ranged from 0.514 to 0.777. We therefore conclude that the new metalearning scale is psychometrically adequate.

3.2.2 Cognitive Holding Power Scale

The cognitive holding power scale, developed by Stevenson and Evans (1994) (Translated by Khedr, 2003), was used to measure the extent to which the learning setting presses learners to engage in different levels of thinking. It includes two subscales totaling 30 items: 13 for first-order CHP (e.g., *I let the teacher tell me what to do.*) and 17 for second-order CHP (e.g., *I feel I have to try out new ideas.*). Participants rated each item on a 5-point Likert scale ranging from "always" to "never". Item and scale psychometrics were calculated. With regard to reliability, the reliability coefficient (Cronbach's alpha) for the first-order CHP was 0.743 and for second-order CHP was 0.825. With regard to validity, the inter correlations among the items and the subscales ranged from 0.232 to 0.635. This confirms the psychometric adequacy of this scale of our Egyptian sample.

3.2.3 Writing Skills Test

We developed a new measure of writing skills in three steps. First, we prepared a new writing skills checklist based on a review of literature (Abdelmaksoud, 2007; Abdel-Aziz, 2008; Ahmed, 2002; Ali, 2008; Amen, 2008; Enos, 2009; Ibrahim, 2009; Mohammed, 2008; Mohammed, 2000) and the Egyptian National Standards Document for Faculties of Education Accreditation (2010). The checklist was sent to faculty members of the Teaching English Foreign Language (TEFL) program to check the content. 90 % of the faculty members agreed on the content. The checklist consisted of six main skills (content, purpose and audience, organization and unity, words and expressions choice, syntax and grammar, and mechanics of writing) and twelve sub skills in its final form. For instance, student teachers should be able to:

1) Write concisely and write content closely related to the thesis statement and the topic sentences.

2) Determine the audience and/ or the purpose (e.g., to entertain, to inform, to communicate, to persuade, to explain) of an intended writing piece.

3) Use the language effectively to convey the purpose of a text to a certain audience.

4) Produce a well -organized piece of writing divided into clear introduction, body and conclusion.

5) Initiate and terminate paragraphs and/ or essays accurately and smoothly with logically sequenced ideas.

6) Use accurate expressions that convey the meaning clearly.

7) Use grammatical rules correctly such as tenses, pronouns, articles etc.

Second, we developed a rubric to assess and score students' writing objectively and in accordance with standards-based assessment. It consists of six main standards assessing the six main skills involved in the checklist, with five indicators for each main skill ranging from a high score of 5 to a low score of 1.

Finally, we constructed a novel writing test to cover the writing sub skills specified by the checklist. It consisted of three topics. It was sent to faculty members of the TEFL program to check its content and appropriateness for measuring the targeted writing sub-skills. Again, 90% of the faculty members endorsed the topics. The reliability and validity of the writing test were calculated. Two people scored each participant's writing skills using the rubric, achieving good reliability (Cronbach's alpha=0.939). Criterion related validity was calculated using a standardized test for measuring writing (Hinkel, 2007). The correlation coefficient was 0.861, which was significant at the .01 level. This confirms the psychometric adequacy of the writing skills test.

3.3 Procedures

We contacted the concerned authorities (responsible officials) and sought their permission in administering the instruments. They distributed the instruments to the students in their various classes and explained the purpose of the study and how to complete the instruments. Finally, we collected the responses and then scored them.

3.4 Results

We used cut-off scores to select participants for the four cells of our design from our overall sample. For the metalearning factor, participants who scored one-half standard deviation above the mean on the metalearning measure were defined as having high metalearning capacity and those who scored one-half deviation below the mean were defined as having low metalearning capacity. Thus, out of 134 participants, 42 were defined as having high metalearning and 30 low metalearning (see Table 2 in Appendices Section). We proceeded differently for the CHP factor because first- and second-order CHP are associated with independent measures. Participants who scored one-half standard deviation above the mean on the first-order CHP measure were defined as having first-order CHP, and analogously for the second-order CHP measure (see Table 2 in Appendices Section). Using these cut-off scores, we selected 72 participants with high and low meta-learning and first- and second order CHP for further analysis.

We conducted a two-way ANOVA with between-subjects factors metalearning (high versus low) and CHP (first-order CHP vs. second-order CHP). The dependent measure was performance on the writing skills test [See Table 3 in Appendices Section for the descriptive statistics for each cell of the design]. There was a main effect of metalearning [$F(1, 68) = 32.103$, $p < .01$], with participants who were high on metalearning capacity having better writing skills than participants who were low on metalearning capacity. This effect was large in size [$\eta^2 = .289$]. There was also a main effect of CHP, with participants demonstrating

second-order CHP having better writing skills than those demonstrating first-order CHP [$F(1, 68) = 7.545$, $p < .01$]. This effect was medium in size [$\eta^2 = .068$]. The interaction between metalearning and CHP was not significant [$F(1, 68) = 3.377$, $p > .05$], indicating that each factor made independent contributions to writing skills.

4. Discussion and Conclusions

The purpose of this study was to investigate individual differences in the English writing skills of Egyptian pre-service teachers majoring in English. The first major finding was that, as predicted, participants with high metalearning capacity demonstrated better writing skills than those with low metalearning capacity. This finding is consistent with the prior literature. Metalearning is a multi dimensional construct composed of awareness, control, metacognition, motivation, and feeling. Skillful writing requires theses capacities. Previous research shows that learners who are metacognitively aware during writing select better, more-task, appropriate learning strategies (Sheorey & Mokkhtar, 2001). Lewis (2002: 19-20) proposes that readers with high metalearning capacity ask themselves questions to measure their progress in writing, as well as re-arrange the author's ideas with their own words for better outcomes. Furthermore, the awareness, motivation, and control components of metalearning, play a vital role in helping readers master the basic skills required for writing (Alves & Castro, 2009; Fildalgo & Tolranse, 2008; Gregg, 2011; Withrow, 2004: 33). In addition, positive feelings have a great effect on writing skills. Additionally, Manoli and Papadopoulou (2012) asserted the role of awareness in writing and comprehending a text. Robinson (2007) emphasized that high metalearning capacity is related to creative writing skills. As Kucukoglu (2013) summarized "Research shows good writers are actively involved with the text, and they are aware of the processes they use to understand what they read" (p. 710). In this view, reading affects their writing.

The finding that high metalearning is associated with better writing skills generalizes prior research in two ways. First, it establishes the importance of metalearning for a new population, Egyptian pre-service teachers majoring in English. Second, it opens the door for future intervention studies. One prediction is that providing explicit metalearning training to this population should improve their writing skills. More informally, these instructors may want to tailor their instruction to more heavily emphasize the metalearning that is an integral part of the developing writing skills.

The second major finding was that, as predicted, participants with second-order CHP demonstrated better writing skills than those with first-order CHP. This finding is also consistent with previous research. Recall that learners with second-order CHP are characterized by initiation, participation and information generation (Stevenson, 1998; Stevenson & Mckavagh 2002; Tapia & Pardo, 2006). There are many reasons why second-order CHP should be associated with better writing skills. Compared to students having first-order CHP, students having second-order CHP have higher performance in their classes (Soler, 2002). Brown (2005) asserted that learners' self activities and teachers' encouragement affect writing skills. Wette (2010) noted that learners' independence and practice improve writing skills and this is the reason behind adopting practice-oriented approach. Gibson (2011) argued that positive learning environments enhance self orientation towards learning and

consequently better writing skills. Moreover, second-order CHP is related to rich learning contexts (Buckley, Gravey, & McGrath, 2011). Additionally, Manoli and Papadopoulou (2012) asserted the role of awareness in writing and comprehending a text.

The current finding, that second-order CHP is associated with better writing skills, generalizes prior findings to a new population, Egyptian pre-service teachers majoring in English. It also sets the stage for future intervention research. One goal would be to design learning environments for teaching writing skills that call for second but not first-order CHP – that are student-centered rather than teacher-centered, and that provide the freedom for students to take initiative in their own learning.

Metalearning and CHP made independent contributions to writing skills. We interpret the absence of an interaction as follows. Metalearning is a property of individual learners. By contrast, cognitive holding power is an attribute of the larger instructional environment, which is orchestrated by the teacher. These factors operate at different levels – that of the individual and that of the environment. Of course, it is always difficult to interpret a null finding. For example, it is also possible that our study lack statistical power, an explanation that future research should address.

More generally, it is imperative that pre-service teachers majoring in English, who will one day be responsible for teaching English as a foreign language, develop strong English writing skills. The results of this study suggest that metalearning and second-order CHP have important roles to play in this process. They are predictors of which pre-service teachers will go on to develop strong English writing skills. They are also targets for

developing new training programs and restructuring current learning environments.

This study has made several contributions to aid in these efforts. We have constructed and psychometrically validated a new metalearning scale, which can be used to measure learners' awareness of motivation, feeling, and metacognition during learning tasks, especially those involving writing. We have also constructed and psychometrically validated a new writing skills test – a writing checklist, scoring rubric, and writing test, that can be used for assessing writing skills of pre-service teachers. Finally, we have adapted a standard assessment of CHP for use with Egyptian participants and established its reliability and validity with this new population. These instruments provide a foundation for future research.

One limitation of the current study is that it only covered one aspect of language, writing skill. Future research should investigate the relation, if any, between metalearning and CHP on one hand and each of the other language skills – listening, speaking, and reading – on the other hand.

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Appendices:

Table :1 Characteristics of first-and second-order CHP

Characteristics	First-Order CHP	Second-Order CHP
Press from setting	Presses students into following instructions or procedures, provided by the teacher, e.g. copying, doing as told, doing as shown, relying on the teacher for ideas	Presses students into working things out for themselves, tackling problems, exploring, e.g. finding links, finding out information, checking results, trying out ideas
Examples of teacher activities	Modeling practical tasks, telling, providing information, generating ideas, instructing, designing tasks for student practice, showing patterns and relationships, checking results	Posing new and problematic tasks, encouraging students to explore and tackle unfamiliar tasks and situations, providing information as requested, encouraging students to find patterns and relationships and check their own results against existing knowledge
Examples of student activities	Performing as tasks demonstrated by the teacher, following set of written or oral instructions, relying on the teacher for new ideas and procedures, executing plans provided by the teacher, relying on the teacher for establishing connections and for confirming results, passively accepting new information and procedures, accepting results of activities	Interpreting new situations, making plans, solving new problems, relating existing and new knowledge, generating ideas, trying out new ideas and procedures, checking the results of new procedures against existing knowledge, monitoring own activities
Cognitive activity	Encoding new propositional knowledge Encoding new specific procedures	Use of second order procedures for making plans, problem-solving and monitoring. Use of propositional knowledge for Interpretation of problems, monitoring new procedures, and assessing progress toward goals. Active reconstruction of propositional knowledge Second order procedures operating on specific procedures

Adapted from Stevenson and Evans (1994)

Table: 2 *Descriptive statistics and cut-off score of the study sample*

Variables	*M*	*SD*	Cut-Off	Score	Group	*n*	Total *n*
Metalearning	232.98	31.14	*M + .5 SD*	248.55	High	42	72
			M – .5 SD	217.41	Low	30	
CHP	39.53	6.45	*M + .5 SD*	42.76	First-Order	30	72
	53.76	10.35	*M + .5 SD*	58.94	Second-Order	42	

Note. M refers to mean, *SD* refers to standard deviation, and *n* refers to the size of the sample subset.

Table: 3 *Writing skills scores for each group*

CHP \ Metalearning	Low	High	*n*
First-Order	13.04 (2.849)	20.75 (0.957)	30
Second-Order	17.75 (5.560)	21.68 (2.384)	42
n	30	42	

Note. Each cell mean is reported *M (SD); n* refers to the size of the sample subset