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ABSTRACT

Two studies examined the potential of analysis of motivational content in private speech to sustain a Vygotskian hypothesis on the goal-forming process in achievement motivation. In the first study, 30 preschoolers and first-graders were observed 3 times during a school year while they worked in the classroom. The relative incidence of child utterances with motivational content varied between 14 percent and 21 percent, depending on the group and time of observation. In the second study, the same group of children was observed twice, this time in a structured situation involving a puzzle task. The relative incidence of private speech with motivational content was greater: between 24 and 30 percent. In addition, several subcategories were positively correlated with task performance and persistence. ANCOVA was used as a better way for contrasting of the first time self-guilding comments and causal attributions influence on second time observation achievement. These results have implications both for goal orientation process research and for the study of the motivational function of private speech. (Contains 49 references.) (EV)

THE MOTIVATIONAL FUNCTION OF PRIVATE SPEECH IN YOUNG CHILDREN

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ABSTRACT

This paper presents two studies which intend to show the potentiality of the analysis of the motivational content of private speech to sustain a Vygotskian hypothesis on the goal-forming process in achievement motivation. In the first study thirty preschoolers and first graders took part. Each one was observed three times in a school year while they worked in classroom. The relative incidence of utterances with motivational content varied between 14% and 21%, depending on the group and time of observation. In the second study the same group of children was observed twice but this time in a structured situation where they all performed a task involving puzzles. The relative incidence of private speech with motivational content was greater: between 24% and 30%. In addition, several subcategories were positively correlated with task performance and persistence. ANCOVA was used as a better way for contrasting of the first time self-guiding comments and causal attributions influence on second time observation achievement. The implications of these results are discussed both for goal orientation process research and for the study of the motivational function of private speech.

The motivational function of private speech

Since the English translation of Vygotskys's "Thought and Language", a number of studies have been conducted in the West to support his major hypotheses about the relationship between speech and practical activity (see Berk, 1992). The findings have supported Vygotsky's general claim that private speech, as a tool of thought, performs important self-regulatory functions. In addition, private speech is seen as an important link between the social and psychological worlds of the individual (Vygotsky, 1978).

Even though Vygotsky's ideas have achieved a wide acceptance among current educational researchers (Diaz & Berk, 1992, Moll, 1990, Rogoff, 1990, Winsler, Diaz & Montero, 1997), most of them are centered on the relationships among social interaction, cognitive development and educational performance. However, some authors (Montero, 1989; Montero & Huertas, 1997; Rueda & Dembo, 1995) have suggested the potentiality of vygotskian perspective for the analysis of motivational processes in education.

This paper tries to link such vygotskian perspective in the field of private speech to the topic of motivation in education. More specifically, this paper tries to show how young children's private speech also plays an important motivational function in educational activities.

In order to do so, we must refer briefly to the three pillars on which this work rests: an extension of Vygotskian theory to the field of motivation in education, a review of the research on the self-regulatory function of private speech and a description of present theories on motivation which allow to analyze the motivational nature of certain utterances appearing in young children's private speech.

A vygotskian perspective on motivation in education

Werstsch (1991) summarizes the theoretical foundations of the work of L.S. Vygotsky (1896-1934) in three points: a) higher mental functions derive from social life, b) a reliance on genetic analysis of such functions and c) the importance of instrumental and semiotic mediation in their configuration.

In relation to the first of these points, the connection which may be made with the field of human motivation in general, and educational motivation in particular, is to hypothesize the social origin of characteristically human motivational processes. (Montero, 1989, Montero & Huertas, 1994). Different research traditions have tended to separate basic motives from social motives (see McClelland, 1985; Mook, 1987). Depending on each epistemological approach, this may imply a radical dualism or simply a laying out of different areas of investigation. However, from a Vygotskian point of view it is held that culture has "revolutionized" biology as a means of transmission of a species' characteristics, so that we may venture the hypothesis that both the most primary motivations and the most social ones require culture to be developed by humans. Thus, certain types of motivation would be clearly linked to the fact that the human species is a social one (for example, power, affiliation and achievement; see McClelland, 1985). But in addition social practices make human motivations for seeking food or reproduction clearly different from other species lower in the phylogenetic scale, since they are channeled through a series of processes and institutions of a social nature.

But this principle of the social origin of motivation has another connotation. We could paraphrase Vygotsky stating that all specifically human motivation appears twice, first in the plane of social activity, interpsychologic, and then in the individual or intra-psychological plane. By an internalization process, the individual makes his own this need which was previously sustained by the group. This internalization process can take place through the Zone of Proximal Development (which does not imply that would be there a specific ZPD for motivation, as held by Sivan, 1986). That is, the child does not only internalize a set of task-

solving skills and knowledge, but also finds a way of becoming engaged in it (Montero, 1989; Montero & Huertas, 1994).

In relation to the second point, regarding the genetic analysis of psychological processes, many studies have been published in the western tradition of psychology on the ontogenetic development of motivation (see, for example, reviews by Stipeck, 1984 or Nicholls, 1990, for achievement motivation). In this tradition, changes seen in the configuration of a certain psychological process throughout a lifetime are illustrated and described. A Vygotskian-type genetic analysis allows to take this even further. Does this process exist in other species, as well as in humans? Are there antecedents in the history of the subject's culture on the value given to this type of activity? What concrete interpretations of such an activity dominate the immediate environment of the child (family, school, friends)? Can such an acquisition process be reproduced under observation? (see McCaslin & Murdock, 1991; Rueda & Moll, 1994; Rueda & Dembo, 1995).

We may say that the entire human motivational system has been built throughout the phylo and socio-genetic development. In a sense, part of this process can be seen in the developmental process of each individual. A baby begins to function with homeostatic regulation motivational systems, the equilibrium of which depend on the social environment. It then begins to use more open processes such as those involved in classical and operant conditioning, but in contexts where antecedents and consequences are socially transported. It is not nature who conditions the behaviour of the child who begins to socialize, but rather this task is carried out by certain figures in its social context. Such figures also play an important role in another system built on the previous ones, modeling. The final step, from the perspective of the functional organization of motivational systems, would be the transition from external regulation to self-regulation (Montero, 1997; cfr. Bandura, 1991). As regards cognitive processes and certain motor processes, there are clear indications that the first steps in this self-regulatory process appear simultaneously with the internalization of language. (Vygotsky, 1962; Díaz & Berk, 1992). This links to the third point mentioned by Wertsch (1991). Given its relevance to this work, we will deal with it separately.

The study of private speech

The extension of the Vygotskian perspective to the study of human motivation would mean that, just as occurs in relation to cognitive processes (see Nelson, 1996, for a recent review on language and cognitive development), internalization of language also becomes a tool for transmission of motivational processes.

Vygotsky (1978) hypothesized the importance of instrumental and semiotic mediation in the configuration of human cognitive processes. The relevance of his hypothesis for development of attention and memory was shown by himself in his research, although his best-known work on this deals with the relationships between thought and speech (Vygotsky, 1934/1962). Since the popularization of his work among western psychologists, a great number of empirical studies have been performed which have successfully supported the explanatory potential of his hypotheses. From the pioneer work of Kohlberg, Yaeger and Hjertholm (1968) to the more recent work of Berk (1986), Frauenglass and Díaz (1985) or Winsler, Díaz and Montero (1997), studies have confirmed, among others, aspects such as the universality of the phenomenon of speech internalization, its social origin, the developmental process it follows and its influence on task performance (see Berk, 1992 for a thorough review). In addition, the importance of private speech in self-regulatory processes has been studied in children with learning disabilities (Berk & Landau (1993), with attention deficits (Winsler, 1998) or sensorial deficits (Jamieson, 1995).

All these studies assume that private speech acquires a self regulatory function in the cognitive plane of the subject. However, with the exception of the study by Montero &

Huertas (1994), with pilot study status, there is no systematic empirical work exploring the possibility that private speech also serves self-regulation of motivational processes. An empirical test of this hypothesis implies that, at least in content, categories for the analysis of motivational relevance be made available. We believe that goal theory can provide a set of observable categories in the spontaneous speech of young children.

The goal theory

The last two decades in the field of educational motivation have witnessed the consolidation of what has been called goal theory (Dweck, 1991). This theory draws in different amounts from the classical theory of achievement motivation (Atkinson, 1964), from the attributional theory of motivation and emotion (Weiner, 1986), from the theory of differentiation (Deci & Ryan, 1985) and from the self-regulation theory, as understood from a social learning perspective (Schunk, 1991). It also includes a set of empirical contributions performed from less general models but which could be labeled as "cognitive" (see Rueda & Dembo, 1995). Among these are the contributions of Dweck and colleagues (Dweck, 1986, 1991; Dweck & Elliott, 1983; Dweck & Legget, 1988), those of Ames (1984, 1992), Covington (1984, 1992), Nicholls (1984, 1990) or Pintrich and collaborators (Pintrich, 1989; Pintrich & De Groot, 1990; Pintrich & García, 1991).

Although it is possible to seek different types of goals within the educational context (Wentzel, 1991), all of the above mentioned authors, with slight variations in nomenclature, refer to two types: in Dweck's terminology (1991), learning goals (to increase competence) and performance goals (gain positive/avoid negative judgment of competence). Both types of goals are configured from a series of elements among which we point out the following: theories of intelligence, expectancies, causal attributions for success and failure, strategy analysis and emotional reactions.

Roughly speaking, children oriented to learning goals are characterized by using an incremental type (malleable) theory of intelligence. In addition, performance standards are personalized, allowing them to maintain a high expectation level for future achievements. They tend to make few causal attributions, but these are inclined to be internal and controllable (effort and skill) both for success and failure. Rather than attributions, what they tend to perform what is known as strategic analysis, that is, they review their task-execution process to become aware of what they have done well and how to improve what they have done wrong. This makes them consider failure as a learning opportunity, and thus their emotional reactions are low intensity and centered on the satisfaction of having made the effort.

On the other hand, children oriented to performance goals are characterized by using an entity type theory of intelligence (fixed or uncontrollable). Their performance standards are governed by normative comparisons. Those believing they have a high level of skill will have high expectations of obtaining a good result as compared to their peers, as opposed to those who, being oriented to this type of goals, believe they have a low level of skill. They frequently make causal attributions on their success and failure. Those with a high skill level attribute success to internal causes and failure to external ones (egotic attributions; Covington, 1992). However, those having a low skill level tend to attribute their success to external, non-controllable causes and their failures to internal causes (helplessness; Dweck, 1991). All of these suffer from a lack of strategic analysis and tend to consider failure as a personal censure. This makes their emotional reactions high-intensity. Those having a high skill level have a maximum reaction to success. High intensity reaction to failure is avoided through an egotic attributional pattern. In the opposite situation, what is maximized is the reaction to failure. Potential positive reaction to success is inhibited by the helplessness pattern (see Pintrich & Schunk, 1996, for a recent and deeper review of all these elements).

Authors such as Nicholls (1990) have investigated the development of most of the elements which configure the goal orientations discussed. One of his consistent findings is that no clear distinction between effort and skill appears until the age of eleven or twelve. However, it should be remarked that for those forming an incremental type theory of intelligence this distinction never fully develops, since they believe effort generates skill. Other authors, such as Stipeck (1984), have also remarked that throughout the schooling process orientation to performance goals interferes with a supposed natural, intrinsic[2] tendency towards learning. The work of Ames (1984, 1992) shows how the use made of a series of dimensions[3] of classroom work tends to orient towards learning goals or performance goals. These dimensions, among others, would be the key with which educational system would contribute towards reducing the intrinsic orientation towards learning.

The motivational function of private speech

The use of elements which configure orientation to goals for the analysis of young children's private speech when they are engaged in academic tasks opens a new line of research. Given the fact that such elements -as expectancies, attributions, emotions or strategic analysis- would be supported through language, we can increase our present knowledge on the self-regulatory functions of speech.

But, in parallel, the observation of private speech has advantages for evaluation of the goal forming process compared to other types of methods such as interviews or questionnaires, since it is a spontaneous type of speech, reducing the expectation bias of the researcher. In addition, from an developmental point of view, the moment of greatest emergence of this type of speech coincides with the first few years of schooling, which allows to obtain data on motivational dynamics at an early age, and therefore to shed light on the beginnings of the process of orientation to learning goals and performance goals and the role of the educational system in such process.

As a first attempt to apply this perspective two studies are presented in this work. The first, longitudinal, with a duration of one school year, took place in the natural context of classroom, and its main aim was to describe the possible presence of private speech utterances with motivational content and their relative importance in the whole private speech. In addition, it allows studying whether longitudinal changes appear within each category studied. Since children from different schools were worked with, dealing with different types of tasks, albeit all in the same area, we designed a second parallel study which would allow us to link private speech and performance in a more controlled manner. This second study consisted of handing the same task to all children involved in the first study. This was carried out in a structured situation, coinciding with the second and third observation of the first study. The method and results of both studies are described in what follows.

First Study Method

Participants

Thirty children participated, fifteen boys and fifteen girls, from two public schools in large suburban areas in Southern Madrid (Spain), half of them from each school. Fourteen of them were preschoolers, with an average age of five years and two months at the start of the first study. The other sixteen were first graders with an average age of seven years and three months at the time of starting. All were Caucasian.

Materials

A VHSc video camera placed in the classroom was used, connected to a uni-directional microphone installed at the desk of the child observed in each case. All were recorded as they carried out their usual tasks in the arithmetic and mathematics area.

A codification system was used for the private speech of the participants developed from one used by Berk (1986) with certain changes. Categories 1b (task irrelevant affect expression) and 2d (task relevant affect expression) were replaced by others of motivational content based on the elements which configure orientation to learning goals and performance goals. Likewise, changes were made in the criteria for inclusion of utterances in categories 2a (describing one's own activity and self-guiding comments) and 2c (reading aloud and sounding out words). All changes made, as well as examples of all categories used can be seen in Appendix B.

Design and Procedure

A longitudinal study was conducted over nine months, from October '97 until June '98. Three observations of each child were performed: October '97, February '98 and June 98, at three month intervals. The observation was made in the children's classroom, with their usual teacher and classmates, carrying out their usual arithmetic and mathematics tasks.

Results and Discussion

Table 1 shows the absolute and relative (percentage) frequencies of private speech utterances for each group of children at each of the three times they were observed. They are shown classified into the three usual levels (see Berk, 1986) and with motivational content. The six columns on the right show the same data with a breakdown of the motivational elements considered in the codification system, without considering result type (success, or positive, versus failure, or negative).

table 1 about here

Cognitive private speech

All children in both classes spoke during the observations, and all also uttered speech with motivational content. As regards private speech classified in the three usual levels, an inverted U distribution can be seen, with greatest production in level 2 (18.63 vs. 47.97 vs. 16.80 for preschoolers; 9.65 vs. 58.79 vs. 14.17 for second graders). Statistical analyses performed show differences between age groups for level 1 (task irrelevant private speech), with the older ones showing the fewest utterances in this category (9.65% vs. 18.63%; $F(1,28)= 3.46$, $p=.073$). The significance of the contrast, although marginal, points in the expected direction (see Berk, 1986; Winsler, Díaz & Montero, 1997). Differences in the utterance percentages also appear in the longitudinal comparison (14.04% vs. 19.71% vs. 8.69%; $F(2,56)=4.25$, $p<.05$). A posteriori comparisons reveal that it is in the third observation where a significant decrease is observed with respect to the two previous ones. This result would also agree with what would be expected from a microgenetic point of view (see Berk, 1992). The interaction between grade and time of observation did not result significant, which implies the evolution is similar for both age groups.

Significant differences also appear with respect to private speech classified in level 2 (task relevant private speech). However (see table 2), these differences only appear in subcategory 2c, i.e. "reading aloud, sounding out words and describing one's own activity" (22.09% vs. 46.69%, $F(1,28)= 12.96$, $p<.001$). In this subcategory there are also indications of a significant change over the three observations (35.11% vs. 36.43% vs. 44.46%; $F(2,56)=2.89$, $p=.064$). Although the level of significance is marginal, the data point towards an increase in private speech accompanying and describing task execution. This increase appears only in the third moment with respect to the two previous ones, with no difference between these. All of this agrees with the data in the literature (ver Berk, 1986, 1992; Winsler, Díaz & Montero, 1997). The interaction between grade and moment of observation is not significant. The interpretation of this data is the same as in the previous case: change patterns are similar for the two age groups.

table 2 about here

No significant differences appear with respect to the third level of private speech, nor for the grade variable, nor for the moment of observation. There is also no joint effect of the two variables. Although an increase would be expected in this type of utterances with age and development of the activities, it is also true that in situations with an adequate challenge, the subjects, regardless of age, have trouble carrying it out in silence. (Díaz, 1992). One might then assume that for both the younger and older children, and throughout the three moments of observation, the tasks given by the teachers were correctly calibrated respect of their difficulty.

Private speech with motivational content

As far as motivational private speech two things should be pointed out. Firstly, the important relative incidence in both groups of children (16.56% average for preschoolers and 17.35% average for second graders) and throughout the three observations (17.62%; 14.44% and 18.84%, respectively). Statistical analyses show that this incidence is stable, both with respect to groups and times of observation. Secondly, the different level of incidence of the various elements categorized is remarkable. Since in absolute terms the incidence is small, we have not considered it convenient to perform a parametric analysis of these differences. In any case, a qualitative evaluation suggests our children make practically no attributions, do not express expectations, do not evaluations with emotional content, do not utter messages indicating an entity type theory of intelligence. It seems that they begin to express some emotional reaction and that they begin to make evaluations, although few. With respect to this last category, given its greater incidence, we analyzed the differences in absolute terms by grade, time of observation and their interaction. No interaction nor grade effect appears, but there are differences in time of observation (.68 vs. 1.18 vs. 1.13; $F(2,56)= 4.23$, $p<.05$). Comparisons show a significant increase from the first moment to the other two, although not between these two last ones. This capacity of evaluation without emotional reactions would be more related to orientation to learning goals than to performance goals.

But in order to maintain the function of this speech, which with respect to its content is motivational, we must go further (Díaz, 1992). For the reasons exposed above we felt it inadequate to study these children's performance, due to the different nature of the tasks they were executing. This led us to conduct a second study.

Second Study Method

Participants

The same thirty children from the first study took part, with the exception of one male of the younger age group who refused to leave the classroom. These were fourteen boys and fifteen girls from two public schools of two large suburban areas in southern Madrid (Spain),

half from each school. Thirteen of them were preschoolers with an average age of five years and six months at the start of this second study. The other sixteen were second graders with an average age of seven years and seven months at the start. All were Caucasian.

Materials

The second study took place in a room outside the classroom. The same recording system as in the previous study was employed. The task performed in this case was puzzle-solving, consisting of TANGRAM puzzles (a Chinese puzzle; see Appendix A) which were presented in four piles of different difficulty.

As in the previous case a category codification system was used for private spech produced by the children as they solved the puzzles. The system was derived from Berk's (1986; see Appendix B).

Design and Procedure

Children were observed twice (February and June '98) as they played with the Tangram. Each time, the researcher invited the child to play with the puzzles, explaining that the task consisted of copying the model on the card with the plastic pieces which were shown in two sets of different colors. After the child chose the color of the pieces to be used, it was explained that any card could be chosen and that they were ordered by level of challenge. Each time the child finished a puzzle correctly, the researcher would suggest doing another, making clear the game ended whenever the child wished. The number of correctly placed pieces (seven maximum) and the challenge level of the puzzle (from one, least challenging, to four, most challenging) were recorded for each puzzle. Likewise, the number of puzzles attempted and the time devoted to the entire series was also recorded.

Results and Discussion

As could be expected (see, Berk, 1992), not all children spoke in this new situation. In the first observation 27 children spoke (93.10%) and in the second 26 (89.65%). In any case, these percentages can be considered quite high given the nature of the situation. Table 3 shows the absolute and relative average frequency data for all categories of the codification system as was done for the first study.

table 3 about here

Cognitive private speech

Just as in the previous study, an inverted U distribution is seen in the incidence of the three private speech levels. However, certain differences are apparent with respect to the natural situation. Although the two situations were not statistically compared, a lower incidence of level 1 utterances can be seen, as well as a higher incidence of level 3 utterances.

As regards the possible differences depending on grade, time of observation and interaction between both variables, these are not observed for level 1 private speech utterances. Note that the absence of utterances may be due to a lower thereshold effect, given the low incidence of this type of utterances in the structured situation.

As regards utterances belonging to level 2, there are differences in relative terms in time of observation. A reduction is showed from one observation to the next (63.11% vs. 52.77; $F(1,27)=5.01$, $p<.05$), implying a tendency to internalization of speech when accompanied by a low incidence of level 1 and an increase in level 3 utterances, which as we will see below is our case (see Berk, 1986). No differences appeared with grade although the data point towards a reduction with age (63.07% vs. 52.81%). The absence of interaction indicates that the reduction between observations occurs similarly for both grades.

As advanced in the previous paragraph, an increase can be observed in the number of utterances classified in private speech level 3 between the first and the second observation (6.80% vs. 17.41%; $F(1,27)=4.90$, $p<.05$) which can be explained in terms of a cue of

internalization of relevant private speech, as we mentioned. The differences with grade (8.76% vs. 15.45%) are not enough to be statistically significant, nor do the data relevant to interaction –although the increase of this type of utterance seems greater in second graders (8.52% vs. 22.38%) than in preschoolers (5.08% vs. 12.44%).

In short, the data obtained in the structured situation match what could be expected from previous studies on onto- and micro-genetic private speech processes (Berk, 1992; Winsler, Díaz and Montero, 1997).

Private speech with motivational content

As regards the incidence of private speech utterances with motivational content, the results are very similar to those of the earlier study. The most striking result is an increase in the incidence of this type of categories, and particularly in their relative weight in the whole of private speech. If in the natural situation an average incidence was observed of 16.95%, here it increases to 27.59%. This would show that we are dealing with a consistent and relevant phenomenon, at least as far as its appearance.

The detailed analysis of the categories which include the different motivational elements is the same as for the previous case, except that here no changes are observed in the number of evaluations from one observation to the next.

Achievement and persistence

The average number of correctly placed pieces in each puzzle was used as a measure of performance, weighted by the challenge level of each puzzle. As a measure of persistency the number of puzzles attempted by the child was used, each one weighted by its challenge level. For achievement, differences were observed in grade, with second graders showing better performance (14.70 vs. 6.92; $F(1,27)=5.91$, $p<.05$). However, no changes in achievement were appreciated from the first observation to the second one. Likewise, no effect is seen of grade and moment interaction. It should be kept in mind that the time elapsed between the two observations (from February to June 1998) was considerable and could make the children face the task as new in terms of the skill developed for its execution.

As regards persistency, there were no changes between age groups nor between times of observation, with no joint effect of the variables appearing either. This would imply that, as relates to persistence, motivation levels for the task were similar for all participants and at both times. It should be considered that motivation is not only indicated by persistence, since both achievement and persistence are considered indexes of motivation (Pintrich & Schunk, 1996).

Private speech, achievement and persistence

Table 4 shows the correlations among all private speech categories and performance and persistence in the first observation. It shows that both "cognitive" private speech and that with motivational content correlate to performance and persistence. Although the amount of correlations is not very high, they reveal a link between language and task performance. Within "cognitive", are the relevant speech subcategories which significantly correlate: 2a (self-guiding comments) with performance and persistence; 2b (self answered questions) only with performance. As regards motivational, evaluation and evaluation with emotional content, they show a significant correlation with performance and persistence. The correlation between performance and persistence is moderate, revealing a common variance of approximately 46%. This fact has a double connotation. Firstly, as mentioned before, both measures are considered motivational indexes (common variance) and secondly, it is relevant to maintain them separate (because of amount of variance not explained by correlation).

table 4 about here

Díaz (1992), among his methodological concerns in the study of private speech,

points out the difficulties entailed in using correlations as a measure of a possible relationship between private speech and performance. To solve this problem he proposes two alternative analysis methods: prediction of performance at time 2 from private speech time 1 and ANOVA (2x2) with time (intra) and private speech (inter) as independent variables. In our case we do not consider it convenient to estimate a regression model given the large number of variables involved and the low number of children participating. Instead (see table 5) we present correlations between private speech uttered during the first observation and performance and persistence occurring during the second observation.

table 5 about here

This table shows significant correlations between private speech categories belonging to two large groups, "cognitive" and motivational and performance and persistence. The degree, amount of these correlations is not high but is relevant to the aim of our study. The results are similar to the previous case, adding expression of emotion to the group of motivational content categories related to performance.

However, although this analysis is better from a methodological point of view, since it converts a retrospective "ex post facto" study into a prospective one (see Dunham, 1988; León and Montero, 1997), we consider that it still has at least two problems. On one hand, the possible relationship between the independent variables themselves (the private speech categories) and on the other, the low incidence of some of these, resulting in an inadequate estimation of the correlation due to its low variability. The first of the problems cannot be solved due to the "ex post facto" nature of our variables. But the second problem can be solved. Diaz suggests an analysis with ANOVA. However, Reichardt (1979) points out that, for non-randomly formed groups, the best estimation method of the independent variable effect is ANCOVA since it results more powerful and unbiased.

We therefore split out the sample by its median, into high and low number of utterances of each private speech category at the time of first observation. We compare their performance and persistence in time two through ANCOVAs separately for each dependent variable, using the corresponding previous measurement as covariable. The only exception was causal attribution. In this case, we classified the sample into two groups: those producing an attribution and those who did not.(six children vs. twenty-three). Table 6 shows results for attributions and utterances of level 2a (self-guiding comments), the two variables which showed significant effects on achievement.

table 6 about here

As can be seen, after eliminating the effect of performance in the first observation, the number of private speech utterances in category 2a (self-guiding comments) in the first observation results in differences in performance in the second (M_{low2a}=6.14 vs. M_{high2a}=9.57; $F(1,26)=4.03$, $p<.06$). From a Vygotskyan perspective, this category captures the moment in which language is not only connected to activity, but begins to guide it. From this point of view the result obtained allows to maintain the relevance of the relationship process between language and task performance. But at the same time, this category (see apendix B) could be considered as an indicator of strategic thought, a type of thought which, as pointed out in the goal theory (Dweck & Elliott, 1983), is characteristic of orientation to learning, positively related to performance, as well as being an alternative behaviour to doing causal attributions.

On another hand, groups formed when separating children making causal attributions during the first observation from children who did not differ significantly in performance during the second observation once the effect of performance in the first one is eliminated. Those who did not make these perform better than those who did ($M_{noatrib}$=10.78 vs.

M_{atrib}=6.25, F(1,26)=3.89, p<.06). Attribution making is related to performance goals orientation, and this type of orientation, depending on each case, is related to poorer performance (Dweck & Elliott, 1983; Dweck, 1991).

Conclusions

Although this was not the main aim of our paper, we should begin by pointing out that as regards the self-regulatory function of private speech, our data, in both the natural and structured situations, replicate the more relevant findings of the literature (Berk, 1992). Our most significant contribution is to put in practice the methodological suggestion of Díaz (1992) with respect to analysis of private speech and performance. Thus, our data support the relevance of self-guiding comments for task performance.

As regards the incidence of private speech utterances with motivational content, both studies show a considerable level, with greater levels in the structured stuation than in the natural one. The explanation of this difference may lie in that in the classroom, given the type of teaching methodology, responsibility on task performance is more diluted than in the structured situation, where the child faced the task with the sole company of the observer.

The low incidence of certain elements, such as attributions, has some theoretical relevance which we would like to remark. According to Weiner (1986), it is causal attribution processes that configures achievement motivation. In our case we can observe motivated children who do not carry out this type of cognitive process.

But as we have already mentioned, only observation of an incidence of private speech with motivational content is not enough to maintain its self-regulatory function. The data obtained in the second study, far from being conclusive, point towards the functional relevance of this type of private speech. In this sense the double link –cognitive and motivational- of self-guiding comments in configuring learning goals must be stressed. In any case, more research is required, with greater variability in production of motivational private speech in order to support our hypothesis more clearly.

In summary, we believe the studies presented show the potentiality of private speech study as a paradigm for research in goal orientation processes, also allowing to hypothesize a new function of self-regulatory speech within a Vygotskian approach. In any event some questions remain. On one hand, studies are required proving the social origin of elements configuring orientation to goals, in the line of work performed by observing adult-child dyads within the field of self-regulatory function of private speech (see Berk, 1992). In addition, although we suspect educational system plays an important role in the origin of performance goals orientation, what is the origin of learning goal orientation?

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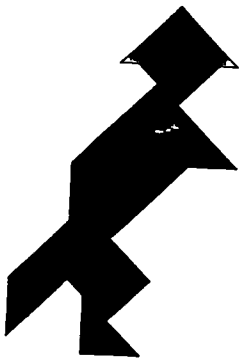
Appendix A

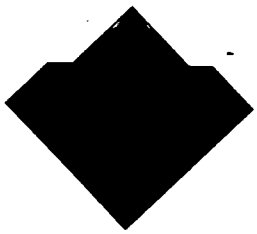
NIVEL 3

SIETE TANS



NIVEL 3

SIETE TANS



NIVEL 2

CINCO TANS

NIVEL 2

CINCO TANS

NIVEL 1

SIETE TANS

NIVEL 1

SIETE TANS

Appendix B

Below are described the categories of the codification system used, giving significant examples for each category. The original categories of the system proposed by Berk (1986) are included and were maintained for this study. The modified categories have been pointed out in the materials section of the studies presented in this paper.

Cognitive private speech

- Level 1: Self stimulating, task irrelevant private speech. It includes word play and repetition and comments to absent, imaginary or non-human others. Examples would be: "It's raining" (looking out the window without addressing anyone). "There's no school tomorrow" (also not addressing anyone). Singing or humming would also be included.

- Level 2: Task relevant externalized private speech. It includes a) self-guiding comments, b) task relevant, self answered questions and c) describing one's own activity, reading aloud and sounding out words. Note that describing one's own activity has been included in 2c. The reason is that we believe this is better in order to separate speech following an action from that which precedes it. In addition, utterances included in our proposal for 2a (self-guiding comments) are also an indication of strategic thought by the child.

Examples of 2a would be: "One...hang on, let's start all over, let's see...". "I've got to start on number two now". "I've got to pay attention".

Examples of 2b would be: "The thing on top of the car?, No, not that one" (without addressing anyone). "Is this the third one?". "The light blue one, isn't there one?". "Where do you write? Oh, I remember".

Examples of 2c would be "Four and three make seven". "I'm making it blue". "I'm coloring them". "Five, six, seven, eight...twelve, it's full". "This one, this one and this one".

- Level 3: Task relevant external manifestations of inner speech. It includes inaudible muttering and lip or tongue movement which are task relevant, most of them being unintelligible for the observer but a clear sign of self directed speech. Examples: counting or enumerating in a low voice or moving their lips. Expressions as "mmm", "aah".

Private speech with motivational content

- Ego involvement: this would include child manifestations which might imply an entity type theory of intelligence and a desire to compete. Some examples would be: "I'm winning!". "I've got two, I've got two, I've got two!". "I'm in first place".

- Causal attributions of success: utterances indicating a causal attribution of a result considered as positive. Each attribution is classified in the three usual dimensions: locus of causality, stability and controllability. Examples: "I got it right because I was paying attention". "I know, because I'm counting".

- Causal attributions of failure: utterances indicating a causal attribution of a result considered as a failure. Examples: "I knew that, but I didn't notice". "I made a mistake, but it's OK". "I haven't got any red" (a color needed to correctly perform the task was missing).

- Positive expectations: those self directed messages which the child makes before starting the task which anticipate a positive outcome of the same. Some examples: "I'm going to do this right". "I'm going to get this". "This house is going to look..." (kissing the air, a Spanish expression of excellence).

- Negative expectations: Self directed messages which the child makes before starting the task which anticipate a negative outcome of the same. Examples: "It's really hard, I'm going to make a mistake". "It doesn't matter, I'll get it wrong".

- Positive evaluation with positive emotion: these would be those evaluations made by the subject on his/her own work accompanied by a positive emotion, that is, expressions of joy for the correct outcome. Examples: "I've finished, I've finished!" (raises arms happily).

"What a nice house" (with happy body motions). "It's right!".

- Positive evaluation: the subject performs a positive evaluation of his/her execution but this is not accompanied by obvious expressions of emotion. "I really like to paint". "It's right, I've counted it on my fingers".

- Negative evaluation with negative emotion: these could be negative evaluations by the subject on his/her own work which are accompanied by an obvious expression of also negative emotion. Examples: "Aah, I've gone outside the line" (with a gesture of throwing away the pencil). "Shoot!, I can't get it!" (with a look of desperation). "Wrong, oh!" (Taking hands to head).

- Negative evaluation: when the subject makes an evaluation of his/her work but this is this is not accompanied by an obvious expression of emotion. Examples: "It's wrong, I've made a mistake". "No, that's not it". "I got it a little wrong". "I messed up".

- Positive emotion: speech utterances expressing pleasure or positive feelings in the child. Some examples: "Ah!", "Good!". "Cool!".

- Negative emotion: speech utterances expressing displeasure or negative feelings in the child. Examples: "Oh!". "Shoot!" "Darn!".

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2 The intrinsic motivation term, as opposed to extrinsic motivation, has been coined principally by Deci & Ryan (1985) in their differentiation theory, although it is also used by other authors such as Csikszentmihaly (1990) in his flow theory.

3 These dimensions are grouped in the TARGET acronym, formed by the initials of Task, Authority, Recognition, Groups, Evaluation and Time.

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