IDENTITY THAT MAKES A DIFFERENCE: SUBSTANTIAL LEARNING AS CLOSING THE GAP BETWEEN ACTUAL AND DESIGNATED IDENTITIES

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In the attempt to account for striking differences between learning activities of immigrant mathematics students from the former Soviet Union and of their native Israeli classmates, we introduce the notions of actual *and* designated identities. *These identities are subsequently presented as important factors that mold learning and influence its effectiveness. Since designated identities may be seen as personalized, "customized" versions of people's cultural heritages, ours is the story of the wider culture making its way into individual learning processes.*

> [For me,] school mathematics was … something that one cannot escape and must try to be done with as quickly as possible… The numbers did not scare me; rather the scary part was my complete lack of interest in them… All that I remember now is my constant effort to match formulas with exam questions.

This quote from a retrospective account of a successful university student[1] is unlikely to surprise a person who knows a thing or two about mathematics learning and teaching. We are all only too familiar with this kind of unhappy reminiscences. Much less common are reports about mathematics-related experiences of interest and joy, such as the one provided by another high-school graduate:

> Mathematics lessons were my favorites. If they were difficult, I saw them as a challenge, as a puzzle to cope with. I was ready to invest time and effort in solving special bonus problems.

What is it that makes some students learn mathematics willingly and with interest while leaving many of their peers indifferent, if not openly resistant? How does this difference influence the learning practices of the student? These questions are certainly not new. They have been fueling mathematics education research ever since its inception. The study to be presented in this talk is a result of yet another attempt to come to grips with the long-standing quandaries.

[1] This and the following excerpt are taken from autobiographical accounts of students who participated in university courses given by the first author in the Education Department at the University of Haifa.

2005. In Chick, H. L. & Vincent, J. L. (Eds.). *Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 1, pp. 37-52. Melbourne: PME.

Our research project was occasioned by the recent massive immigration from the former Soviet Union to Israel.[2] More specifically, it was triggered by a spontaneous, yet-to-be-tested observation that a disproportionately large portion of this particular group of immigrants could pride itself with impressive results in mathematics, and not just in school, but also in national and international mathematical competitions.[3] We began asking ourselves whether there was anything unique about the immigrant students' mathematics learning and if there was, how this uniqueness could be accounted for. The conjecture we wished to test while launching our investigation was that dissimilarities in learning processes, rather than being a simple outcome of cognitive differences between individual learners, are a mixed product of individual and collective doing. Such differences, we believed, are often reflective of differing sociocultural histories of the learners.

In what follows, we try to substantiate this hypothesis on the basis of our findings. We begin with detailed examples of the two types of learning, the *ritualized* and the *substantial*, signaled by the students' testimonies quoted above. In our study, both kinds of learning have been found in one class consisting of native Israelis and immigrant mathematics students. The dissimilarities in learning paralleled the difference in the students' sociocultural background. In the attempt to understand how sociocultural factors made their way into the learners' individual activities, we introduce the notions of *actual* and *designated identities* which then serve as the "missing link" between culture and learning.

TWO TYPES OF LEARNING: SUBSTANTIAL AND RITUALIZED

Example to think with: NewComers and OldTimers as mathematics learners

The study began in fall of 1998 and focused on one 11th grade class that followed an advanced mathematics program. 9 out of the 19 students were *NewComers* – recent immigrants from big cities in the former Soviet Union such as Moscow, Kiev and Tbilisi. The rest were native Israelis, whom we call *OldTimers*. All of the students came from well-educated families. The second author, a one-time immigrant from the Soviet Union, served as the teacher. In the course of the entire school year all classroom processes were meticulously observed and documented. Numerous interviews with the students, with their parents and with other teachers constituted additional data.

[2] According to the leading Israeli newspaper *Haaretz*, "Approximately 200 thousand children immigrated to Israel in 11 years, most of them from the former Soviet Union; they constitute 15% of the Israeli youth"(31.08.2001).

[3] This conjecture should not be misread as saying that the immigrants from the former Soviet Union are generally highly successful in mathematics. This said, "[t]here are [immigrant] children who arrive at the highest places in international competitions in mathematics and physics and thanks to them, Israel climbed from 24th to 13th place in the 1995 international championship" (*Haaretz,* 2 August 1996).

The salience of the differences between the learning processes of the two groups exceeded our expectations. In this article we present only a tiny vignette from this extensive research project (the full report can be found in Prusak 2003). It must be stressed, however, that the striking intra-group homogeneity and the significant inter-group difference reported on these pages is representative of all our results, whatever the particular aspect of learning considered in the analyses.

The sub-study in question focused on independent learning. Our story begins in the tenth week of the school year, on the day when the class got the unusual homework assignment: After having learned trigonometry for two months and, in particular, after being introduced to the theorem known as *law of sines*, the learners were asked to study the new subject, *law of cosines and its applications*, with the help of a textbook. To guide their independent learning, the teacher proposed a work plan, which was presented as a series of questions to be answered in the course of the study*: (1) How can the law of cosines be presented in words?(2) How can it be formulated in the language of algebra? (3) How can it be proved? (4) What is its importance?* The teacher advised that the students write their answers to the questions once they were sure they understood the subject.

The first difference between the two groups has shown when, a few days later, the teacher asked to see the notes made by the learners as a part of their homework assignment. This request surprised some students. After all, the teacher did not request the written answers, she had only recommended them as potentially helpful. And yet, whereas only 4 out of the 9 NewComers had anything written to show, the OldTimers, with no exception, were able to come up with the kind of notes the teacher was asking for. The two groups differed further in the nature of the available record. As a rule, the OldTimers' answers to the teacher's questions were simply the relevant passages copied from the textbook. Of the four NewComers who did make notes, only one answered all four questions, whereas the sole focus of the other three sets of records was the proof of the cosine law (question 3 in the work plan.) Two of these proofs were quite unlike anything that could be found in other students' notebooks, so it was clear that these were students' reconstructions rather than quotes from the book.

Impressed by this visible disparity, the teacher asked whether anybody in the class felt a need for an additional explanation. This time, there was no difference between the OldTimers and NewComers: All the students felt that the topic has been understood. In spite of this, the teacher declared her wish to probe a bit further. She asked the class to formulate the law of cosines and to prove it in writing. The request was accompanied by a blackboard drawing of a triangle, marked with letters different from those that appeared in the textbook. The following passage from the teacher's journal presents students' reaction to the previously unannounced test:

> Several OldTimers started complaining: "We learned at home with the letters A, B, C and we got used to them"… The Newcomers did not show any sign of surprise. All of them, even Boris, usually the slowest, finished quickly.

Type of response	Number of responses	
	OldTimers	**NewComers**
Full proof, textbook version	1	6
Full proof, modified version	-	2
Partial, erroneous proof	1	-
No proof	8	1

Table 1: Students' responses to the request to prove the law of cosines

As shown in Table 1, the results attained by the two groups could hardly be more dissimilar: While all NewComers but one succeeded in the task, only one of the OldTimers was able to produce a reasonable proof. Moreover, two of the NewComers came up with their own versions of the proof, the type of response that is usually taken as the most persuasive evidence of understanding.

OldTimers (translated from Hebrew)	**NewComers** (translated from Russian)
Ada, *who* did not *succeed in reproducing the proof:* I read the chapter in the book and tired to understand When I felt I understood, I copied the proof to the notebook	***Sonya,*** *who succeeded in reproducing the proof:* I read the proof a number of times, trying to remember and making notes on a separate page. I reproduced the proof without writing and I wrote the proof from memory with the book closed. I compared the proof to the one in the book. I then read and tried to understand the examples [of application] in the book
Liora, *who* did not *succeed in reproducing the proof:* Copied the verbal formulation [of the cosine law], drew a triangle *in the head* [the student's own emphasis], read the verbal presentation and translated to letters in the head. Compared the formula to the one in the book and copied into the notebook. Read the proof and understood what they did. Solved the problems with the help of the formula. In case [I] could not do it, read the solved example.	***Misha,*** *who succeeded in reproducing the proof:* I began by translating [to Russian] of all the words in the theoretical text that were unclear to me. I read the theorem again until I understood its proof. When I was sure I understood the theorem, I drew a triangle with vertices marked differently than in the book and I wrote the new proof without looking into the book. After I finished, I checked the correctness of the proof with the help of the book. I read and understood the solved examples [of problems] in the book and began solving the homework problems.

Table 2: Representative responses to the question
How did you learn? Describe the process in some detail.

Once they completed their proofs, the students were asked to describe in writing the steps they performed while implementing the homework assignment. The

NewComers were allowed to respond in Russian. The English version of representative answers can be found in Table 2. The two columns give rise to two strikingly different pictures of the learning process: Whereas the OldTimers satisfied themselves with reading the book and answering the teacher's four questions by copying the relevant passages from the book, the NewComers intertwined reading the textbook exposition with their own independent attempts to formulate and prove the theorem.

We may now sum up and say that the OldTimers and NewComers differed in a consistent manner both in the way they learned and in the results attained. The learning process of the NewComers was clearly associated with their greater success on the test. The fact that the sequence of steps performed by the only OldTimer who managed to produce a correct proof was closer to that of NewComers than to that of OldTimers confirms this latter claim: There seems to be a tight correspondence, perhaps even a causal relationship, between the way NewComers learned and the effectiveness of their learning.

DEFINING SUBSTANTIAL AND RITUALIZED LEARNING

The first thing that strikes the eye in our data is that NewComers' and OldTimers' actions seem to have been directed at different recipients. The fact that the OldTimers implemented all the tasks required by the teacher apparently without asking themselves why they were performing these particular steps shows that, for these learners, the teacher was the ultimate addressee. NewComers, unlike OldTimers, did not perform all the prescribed tasks, and if they did, they did not leave any written records, evidently not being bothered about showing their work to the teacher. Thus, whatever these latter students did at home, they did it for themselves, according to their own assessment of its importance. In this activity, they were their own judges, and we have grounds to suspect that in this role, some of them were more exacting than anybody else, including the teacher.

Activities that have different addressees are usually perceived as having different goals. Clearly, in the eyes the OldTimers the process of learning was the end in itself, whereas the only thing that really counted for the NewComers was a certain product of the process, one that could be trusted to outlast the activity itself. In other words, the NewComers wanted the learning-induced change to be robust and durable. The desired lasting transformation can best be described in terms borrowed from what Harré & Gillet (1995) call *discursive psychology* and what was named *communicational approach to cognition* by other writers (Sfard 2001, Sfard & Lavi 2005; Ben Yehuda et al. 2005). According to the basic tenet of this approach, *thinking can be usefully conceptualized as a form of communication*, with this latter term signifying interaction that does not have to be audible, verbal, synchronic or directed at others. Within this framework, school *learning becomes the activity of changing one's discursive ways in a certain well defined manner*. In particular, learning to think mathematically is tantamount to being initiated into a special form

of discourse, known as mathematical. Armed with this conceptual apparatus we may now say that for the NewComers, learning was the activity of introducing a lasting change into their own discursive activity, whereas for OldTimers it meant an episodic, ritualized participation in a discourse initiated by others.

We decided to call the two types of learning *substantial* and *ritualized*, respectively. In ritualized learning the learner engages in the mathematical discourse only in response to other person's request and for this other person's sake. In contrast, substantial learning may be defined as one that results in turning the new discourse from its initial status of a *discourse-for-others* into a *discourse-for-oneself*, that is, into a discourse in which this person is likely to engage spontaneously while solving problems and trying to answer self-posed questions.[4] This special kind of learning has a lasting effect on one's communication with oneself, that is, on this person's thinking.

The NewComer' strenuous effort toward substantial learning, noticed in the learning episode reported above, could be observed all along our extensive study, whatever the aspects of learning considered in its different segments. This effort was clear whether we were watching the students simplifying a complex algebraic expression, proving a trigonometric identity or trying to collaborate with others in solving a non-standard problem. On these diverse occasions, the NewComers' wish to turn the new discourse into a communication with themselves was evidenced also by their constant backtracking and self-examination, by their conspicuous preference for individual work, by their care for the appropriateness of their mathematical expression, and more generally, by their insistence on following all those rules of communication which they considered as genuinely 'mathematical'.

DEFINING IDENTITY[5]

Why talk about identity?

The striking dissimilarities between the OldTimers' and NewComers' learning called for explanation. Although we had a basis on which to claim the existence of some systematic differences in the teaching practices in the former Soviet Union and in Israel, these differences did not seem to tell the whole story. A teaching approach might have been responsible for the NewComers' acquaintance with certain techniques, but this fact, *per se*, did not account for the students' *willingness* to use these methods. We felt that to complete the explanation, we needed to clarify why the

[4] The term *discourse-for-oneself* is close to Vygotsky's idea of *speech-for-oneself*, introduced to denote a stage in the development of children's language (see e.g. Vygotsky 1987, p.71). Our terms also brings to mind the Bakhtinian distinction between *authoritative discourse*, a discourse that "binds us, quite independently of any power it might have to persuade us internally"; and *internally persuasive* discourse, one that is "tightly woven with 'one's own world.' (Bakhtin, 1981, pp. 110-111.)

[5] For a more extensive presentation of the topic see Sfard & Prusak 2005.

participants of our study were among those students who actually took advantage of the learning opportunities created by their teachers.

Yet another obvious explanation for the effectiveness of the NewComers' learning was that their immigrant status amplified their need for success.[6] Although certainly true, this account did not seem to be telling the whole story since it did not explain why school mathematics was singled out by the immigrant participants of our study as the medium through which to exercise their pursuit of excellence. Indeed, no other immigrant population, of which Israel has always had many, displayed a comparable propensity for mathematics. We decided to turn to the notion of identity, viewing it as a conceptual link between the collective and the individual.

Although the term "identity" is not new, it is only quite recently that it began drawing attention of educators at large, and of researchers in mathematics education in particular (see e.g., Boaler & Greeno, 2000; Nasir & Saxe, 2003; Cobb, 2004; Roth, 2004). Its new prominence is reflective of the general sociocultural turn in human sciences. The related time-honored notions of *personality*, *character*, and *nature,* being irrevocably tainted with connotations of natural givens and biological determinants, are ill-suited to the sociocultural project. In contrast, *identity*, which is thought of as man-made and as constantly created and re-created in interactions with others (Holland & Lave, 2003), seems just perfect for the task. Together with the acceptance of identity as the pivotal notion of the new research discourse comes the declaration about humans as active agents who play decisive roles in determining the dynamics of social life and in shaping individual activities.

We believe that the notion of identity is a perfect candidate for the role of "the missing link" in the researchers' story of the complex dialectic between learning and its sociocultural context. However, we also believe that this notion cannot become truly useful unless it is provided with an operational definition.

Defining identity

Its current popularity notwithstanding, the term 'identity' is usually employed without being operatively defined. The few defining attempts that can be found in the literature appear to be a promising beginning, but not much more than that. Gee (2001), who declares that "Being recognized as a *certain 'kind of person*' in a given context" (p. 99) is what he means by 'identity' also relates this notion to "the person's own narrativization" (p. 111), that is, to stories a person tells about herself. The motif of "person's own narrativization" recurs in the description proposed by Holland et al. (1998), even if formulated in different terms:

[6] As observed by Ogbu (1992), the status of minority is a doubly-edged sword. As shown by empirical findings, belonging to minority may, in some cases, motivate hard work and eventual success, whereas in some others it would have an opposite effect. Immigrants, whom Ogbu calls "voluntary minorities" as opposed to those whose minority status was imposed rather than chosen, are more likely than the others to belong to this former group.

> People tell others who they are, but even more importantly, they tell themselves and they try to act as though they are who they say they are. These self-understandings, especially those with strong emotional resonance for the teller, are what we refer to as identities. (p. 3)

If we said that these two descriptions are "promising beginnings" rather than fully satisfactory definitions, this is because of one feature that they have in common: They rely on the expression "who one is" or its equivalents. Unfortunately, neither Gee nor Holland and her colleagues make it clear how one can decide about "who" or "what kind of person" a given individual is. This said, their descriptions have an important insight to offer: By foregrounding "person's own narrativizations" and "telling who one is," these definitions link the notion of identity to the activity of communication. In an attempt to arrive at a more operational definition of identity we decided to build on the idea of identifying as communicational practice, thereby rejecting the notion of identities as extra-discursive entities which we merely "represent" or "describe" while talking.

In concert with the vision of identifying as a discursive activity, we suggest that identities may be defined as collections of stories about persons or, more specifically, as those narratives about individuals that are *reifying*, *endorsable* and *significant*. The reifying quality comes with the use of verbs such as *be*, *have* or *can* rather than *do*, and with the adverbs *always*, *never*, *usually*, etc. that stress repetitiveness of actions. A story about a person counts as *endorsable* if the identity-builder is likely to say, when asked, that it faithfully reflects the state of affairs in the world. A narrative is regarded as *significant* if any change in it is likely to affect the storyteller's feelings about the identified person. The most significant stories are often those that imply one's memberships in, or exclusions from, various communities.

As a narrative, every identifying story may be represented by the triple ${}_{B}A_{C}$, where A is the identified person, B is the author and C the recipient. Within this rendering it becomes clear that multiple identities exist for any person. Stories about a given individual may be quite different one from another, sometimes even contradictory. Although unified by a family resemblance, they depend both in their details and in their general purport on who is telling the story and for whom this story is meant. What a person endorses as true about herself may be not what others see enacted. To ensure that this last point never disappears from our eyes, we denote the different identities with names that indicate the relation between the hero of the story, the storyteller, and the recipient: ${}_{A}A_{C}$, a story told by the identified person herself, will be called A's *first-person* identity (1st P); ${}_{B}A_{A}$, a story told to its main character, will be named *second-person* identity (2nd P); finally, ${}_{B}A_{C}$, a story told by a third party to a third party, will be referred to as *third-person identity* (3rd P). Among all these, there is one special identity that comprises the reifying, endorsable, significant 1st P stories the storyteller addresses to herself (${}_{A}A_{A}$). It is this last type of stories that is usually intended when the word *identity* is used unassisted by additional specifications. Being

a part of our ongoing conversation with ourselves, the first-person self-told identities are likely to have the most immediate impact upon our actions.

With the narrative definition, human agency and the dynamic nature of identity are brought to the fore, whereas most of the disadvantages of the traditional discourses on "personality", "nature" or "character" seem to disappear. The focus of the researcher's attention is now on things said by identifiers and no essentialist claims are made about narratives as mere "windows" to an intangible, indefinable entity. As stories, identities are human-made and not God-given, they have authors and recipients, they are collectively shaped even if individually told, and they can change according to the authors' and recipient' perceptions and needs. As discursive constructs, they are also reasonably accessible and investigable.[7]

Toward a theory of (narrative defined) identity

Since questions about identity can now be translated into queries about the dynamics of narratives, and since this latter phenomenon is amenable to empirical study, the narrative definition may be expected to catalyze a rich theory of identity. Much can now be said about identities simply by drawing on what is known about human communication and on how narratives interact one with another. Let us present some initial, analytically derived thoughts on how identities come into being and develop.

Actual and designated identities. The reifying, significant narratives about a person can be split into two subsets: *actual identity*, consisting of stories about the actual state of affairs, and *designated identity*, composed of narratives presenting a state of affairs which, for one reason or another, is *expected* to be the case, if not now then in the future. Actual identities are usually told in present tense and are formulated as factual assertions. Statements such as *I am a good driver*, *I have an average IQ*, *I am army officer* are representative examples. Designated identities are stories believed to have the potential to become a part of one's actual identity. They can be recognized by their use of the future tense or of words that express wish, commitment, obligation or necessity, such as should, *ought*, *have to*, *must*, *want*, *can/cannot*, etc. Narratives such as *I want to be a doctor* or *I have to be a better person* are typical of designated identities.

The scenarios that constitute designated identities are not necessarily desired, but are always perceived as binding. One may expect to "become a certain type of person,"

[7] For all these obvious advantages, one may claim that "reducing" identity to narratives undermines its potential as a sense-making tool. Story is a text, the critic would say, and identity is also, maybe even predominantly, an experience (see e.g. Wenger, 1998). Although we agree that identities originate in daily activities and in the "experience of engagement", we also posit that it would be a category mistake to claim that these characteristics disqualify our narrative rendering of identity. Indeed, it is our *vision* of our own or other people's experiences, and not these experiences as such, that constitutes identities. Rather than viewing identities as entities residing in the world itself, our narrative definition presents them as *discursive counterparts* of one's lived experiences.

that is, to have some stories applicable to oneself, for various reasons: because the person thinks that what these stories are telling is good for her, because these are the kinds of stories that seem appropriate for a person of her sociocultural origins or just because they present the kind of future she is designated to have according to others, in particular to those in the position of authority and power. More often than not, however, designated identities are not a matter of a deliberate rational choice. A person may be led to endorse certain narratives about herself without realizing that these are "just stories" and that they have alternatives.

Designated identities give direction to one's actions and influence one's deeds to a great extent, sometimes in ways that escape any rationalization. For every person, some kinds of stories have more impact than some others. *Critical* stories are those core elements, which, if changed, would make one feel as if one's whole identity changed: The person's 'sense of identity' would be shaken and she would lose her ability to tell in the immediate, decisive manner which stories about her are endorsable and which are not. A perceived persistent gap between actual and designated identities, especially if it involves critical elements, is likely to generate a sense of unhappiness.

Where do designated identities come from? The role of significant narrators. Being a narrative, the designated identity, although probably more inert and less context-dependent than actual identities, is neither inborn nor entirely immutable. Like any other story, it is created from narratives that are floating around. One individual cannot count as the sole author even of those stories that sound as if nobody has told them before.

To put it differently, identities are products of discursive diffusion – of our tendency to recycle strips of things said by others even if we are unaware of these texts' origins. Paraphrasing Mikhail Bakhtin, we may say that any narrative reveals to us stories of others.[8] Identities coming from different narrators and being addressed at different audiences are in a constant interaction and feed one into another. These stories would not be effective in their relation-shaping task if not for their power to contribute to the addressees' own narratives about themselves and about others. Thus, the people to whom our stories are told, as well as those who tell stories about us, may be tacit co-authors of our own designated identities. Either by animating other speakers or by converting their stories about us to the first person, we incorporate our 2nd and 3rd person identities into our self-addressed designated identities.

Another important sources of one's own identity are stories about others. There are many possible reasons for turning such narratives into first person and incorporating them into one's own designated identity. Thus, for example, the identity-builder may be attracted either to the heroes of these narratives or to their authors. Another reason may be one's conviction about being "made" in the image of a certain person (e.g., of

[8] Bakhtin (1999) spoke about utterances and words rather than stories.

socially deprived parents, alcoholic father or academically successful mother) and "doomed" to a similar life. Whether a story told by somebody else does or does not make it into one's own designated identity depends, among other things, on how significant the storyteller is in the eyes of the identified person. *Significant narrators,* the owners of the most influential voices, are carriers of those cultural messages that will have the greatest impact on one's actions.

Learning as closing the gap between actual and designated identities. It is now not unreasonable to conjecture that identities are crucial to learning. With their tendency to act as self-fulfilling prophecies, identities are likely to play a critical role in determining whether the process of learning will end with what counts as success or with what is regarded as failure.

These days, in our times of incessant change, when the pervasive fluidity of most social memberships and of identities themselves is a constant source of fears and insecurities, the role of learning in shaping identities may be greater than ever. Learning is our primary means for making reality in the image of fantasies. The object of learning may be the craft of cooking, the art of appearing in media or the skill of solving mathematical problems, depending on what counts as critical to one's identity. Whatever the case, learning is often the only hope for those who wish to close a critical gap between their actual and designated identities.

IDENTITY AS AN INTERFACE BETWEEN CULTURE AND LEARNING

The designated identities of NewComers and of OldTimers

Let us go back to our study on NewComers and OldTimers learning mathematics together and show how our conceptual apparatus helps us in answering the question about cultural embeddeddness of learning. Below we argue that designated identities of the OldTimers and of NewComers were the channel through which these students' cultural background was making its way into their mathematical learning.

To map NewComers' and OldTimers' designated identities, we listened to their stories about themselves told to their teacher on various occasions. True, what we really needed were *self-addressed* stories of the type ${}_{A}A_{A}$ rather than ${}_{A}A_{Teacher}$, because this former type of narrative was more likely to interact significantly with one's actions. This preference notwithstanding, we were confident that the teacher-addressed designated identities would prove informative, especially if they displayed diversity paralleling the observed differences in learning. Further, we made certain deductions regarding the NewComers' and OldTimers' expectations from themselves on the basis of their self-referential remarks, of their comments about others (e.g. the teacher of fellow students), and of our own observations on the ways they acted. As a background, we used interviews with the students' parents and with other teachers. What was found with the help of this multifarious evidence displayed intra-group uniformity and inter-group differences comparable in their salience to those observed previously in the context of the students' learning.

	OldTimers	NewComers
Future plans ("What do you want to do in future?")	• [What I want to do] changes, because I change • For me, the only important thing is to be happy, and I don't have any particular profession in mind.	• In Russia I knew all the time that I'll follow in my brother's footsteps and learn computers. • From the earliest childhood I dreamt to be a medical doctor, like my mother.
The reasons for learning mathematics ("I learn mathematics because…)	• matriculation certificate with advanced mathematics will help me to get to the university, especially if the grade is high • I have to pass matriculation examination if I want to achieve anything in life. • it is obligatory	• I need knowledge and good education, and I love learning. • mathematics is my favorite school subject • I need to be a "full-fledged human being" and I want to feel I did something in life. • for me learning mathematics means creativity • mathematics is important and I like it very much

Table 3: Elements of OldTimers' and NewComers' designated identities

As can be seen from the students' responses to the question "What do you want to do in future?" presented in Table 3, probably the most obvious critical element of the NewComers' vision of themselves in the future was their professional career. Their tendency to identify themselves mainly by their designated professions stood in stark contrast to the OldTimers' declarations on their need "to be happy" and the latter interviewees' adamant refusal to specify any concrete plans for the future. The professions desired by the NewComers (e.g., computer scientist, medical doctor, engineer) were all related to mathematics, and this appeared to account for these students' special mathematical proclivity. And yet, there seemed to be more to these students' inclination toward mathematics than just the wish to promote their professional prospects. According to the NewComers' frequent remarks, the special attraction of mathematics was in the fact that its rules could be seen as universal rather than specific to a particular place or culture. While explaining why they chose to learn advanced mathematics (see students' completions of the sentence "I learn mathematics because…" in Table 3), the NewComers spoke about the knowledge of mathematics as a necessary condition for her becoming "a fully-fledged human being." We have thus reason to claim that mathematical fluency as such, and not just anything that could be gained through it, constituted the critical element in the NewComers' 1st P designated identities. In contrast OldTimers, in explaining their choice of advanced mathematics course, stressed the fact that matriculating in this subject with high grades would largely increase their chances for being accepted to the university. In other words, if OldTimers were attracted to mathematics it was mainly, perhaps exclusively, because of its role as a gatekeeper.

To sum up, the NewComers' designated identities portrayed their heroes as exemplars of what the immigrant students themselves described as "the complete humans," with this last term implied to have a timeless, universal, generally accepted meaning, and with mathematical fluency being indispensable for the completeness. In contrast, the OldTimers expected to have their future life shaped by their own wishes and needs, which, at this point in time, were seen as fluid and, in the longer run, unforeseeable. This also points to a distinct meta-level difference between the two groups: Whereas the NewComers saw their highly prescriptive designated identities as given and apparently immutable, just like the mathematics they wanted to master, the OldTimers' expected their 1st P identities to evolve with the world in tandem.

In accord with our expectations, all this seemed to account, at least in part, for our former findings about the difference between OldTimers' and NewComers' learning. The NewComers needed mathematical fluency in order to close the critical gap between their actual and designated identities. For the OldTimers, this fluency was something to be shown upon request, like an entrance ticket that could be thrown away after use and that had no value of its own. Since mathematical skills did not constitute a critical element of the OldTimers' designated identities, these skills' absence or insufficiency did not create any substantial learning-fuelling tension.

On the cultural roots of designated identities

Where does the disparity between NewComers' and OldTimers' designated identities come from? was the last question we had to address in order to complete our story of designated identity as a link between learning and its sociocultural setting. More specifically, we needed to account for the fact that mathematical fluency constituted the critical element of the NewComers' designated identities but did not seem to play this role in the identities of OldTimers.

The first thing to say in this context is that given the NewComers' immigrant status, their being well versed in mathematics appeared of a redemptive value: The universality of mathematical skills was likely to constitute an antidote to these students' sense of local exclusion. To put it in terms of identity, we conjecture that whereas NewComers were bound to identify themselves as outsiders to their local environment, mathematical prowess was one of those properties that compensated them with the more prestigious, place-independent status of "people of education and culture."

Clearly, the idea that education at large, and the fluency in mathematics in particular, might counterbalance the less advantageous elements of their identity was not the young NewComers' original invention. In general, what the participants of our study expected for themselves was not unlike what their parents and grandparents wished for them. This is what transpired in both groups from the students' assertions about the full accord between their own and their parents' expectations, and from their remarks about the parents' impact on their choices (see sample responses to the question about the parents' expectations in Table 4). This said, there was an

important difference between our two populations. Unlike in the case of NewComers, the OldTimers' parents were described as willingly limiting the area of their influence and leaving most decisions in the young people's own hands. We also found it quite telling that parents were rarely mentioned in the OldTimers' autobiographical testimonies, whereas the NewComers' accounts were replete with statements on the elders' authority and with explicit and implicit assertions on the parents' all-important role in their children's lives. Obviously, the OldTimers' parents' stories about their children's future were not as prescriptive as those of the NewComers, nor was the influence of these stories equally significant.

OldTimers	**NewComers**
• My parents want for me what I want myself. They want me to do what I want. • What is good for me – that's what they want for me. I also think that they find my plans appropriate. • My parents want me to be happy, so it is not so important for them what I'm going to do. • They want me to be what I want to be.	• My mother wants me to get good education. The process of learning itself, this is what is important to her. But a good matriculation certificate too, of course. She also wants me to study in the university. • I chose studying computers because my parents "pushed" in this direction. • My parents know best what's good for me. • For me, my grandma is the greatest authority • My mother tells me that if I meet an obstacle, I'll fail because of my laziness. I am lazy.

Table 4: Students' responses to the question about the parents' expectations regarding their children's future

Narratives about education as a universal social lever and about knowledge of mathematics as one of the most important ingredients of education evidently constituted a vital part of the NewComers' cultural tradition. In their native countries, their families belonged to the Jewish minority. According to what we were told both by the students and by their parents, these families had typically identified themselves as locally excluded but globally "at home" thanks to their fine education. Their sense of only partial attachment to the ambient community was likely the reason for the young people's relative closeness to their families. In the interviews, both the parents and the children sounded fully reconciled with their status of local outsiders. Proud of their cultural background and convinced about its universal value, they seemed to consider this kind of exclusion as the inevitable price for, and thus a sign of, the more prestigious, more global cultural membership. It seems, therefore, that the NewComers' identities as local outsiders destined to overcome the exclusion with the help of place-independent cultural assets such as mathematics were shaped by their parents' and grandparents' stories prior to the students' immigration to Israel.

Since significant narrators can count as voices of community, all these findings corroborate the claim that designated identities are products of collective storytelling – of both deliberate molding by others and of incontrollable diffusion of narratives that run in families and in communities. This assertion completes our empirical instantiation of the claim on designated identity as "a pivot between the social and the individual" aspects of learning (Wenger, 1998, p. 145).

CONCLUDING REMARKS

In this study, the narrative-defined notion of identity allowed us to get an insight into the mechanism through which the wider community, with its distinct cultural-discursive traditions, impinges on its members' mathematics learning. On this occasion, we presented substantial learning as an activity propelled by the tension between actual and designated identities. Let us conclude this talk with two comments on practical and methodological implications of this study.

First, although our account may sound as a praise of the NewComers' learning, there is, in fact, no side-taking in this report. Even if the NewComers' practices can count as somehow superior to those of the OldTimers in that they proved more effective in attaining the official goals of school instruction, we are well aware that the goals themselves may be a subject to critical reappraisal. In addition, the price to be paid for this type of learning practice may, for some students, be too high to be worthy. Although carefully crafted stories about one's "destiny" may sometimes work wonders, they are also likely to backfire when the burden of too ambitious, too tightly designated, or just ill-adjusted identities becomes unbearable.

Second, while constructing the conceptual framework supposed to help us in justifying the claim about the cultural embeddeddness of mathematics learning, we switched from the talk about identity as a "thing in the world" to the discourse in which this term refers to a type of narrative. The difference between these two renderings is subtle. The kinds of data the narratively-minded researcher analyzes in her studies is the same as everybody else's: these are stories people tell about themselves or about others to their friends, teachers, parents, and observers. The only distinctive feature of the narrative approach is that rather than treat the stories as windows to some other entity that stays the same when "the stories themselves" change, the adherent of the narrative perspective is interested in the stories as such, accepting them for what they appear to be: Words that are taken seriously and shape one's actions. Mapping the intricate relations between different kinds of narratives and fathoming the complex interplay between stories told and deeds performed was the sole focus of this study. By taking a close look at the narratives' movement between one generation to another and between the level of community to that of an individual and back, we hoped to be able to account for both the uniformity and the diversity typical of human ways of acting.

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