6 The language of real life and the real life of language

> It is known that one of the most serious errors of the entire traditional psychology is the separation of the intellectual from the affective-volitional side of consciousness. Thinking thereby necessarily transforms into an autonomous stream of thoughts thinking themselves and isolates itself from *the total plenitude of real life, the living motives, interests, needs of the thinking human being.* It thereby becomes a completely unnecessary epiphenomenon, which cannot change a thing in the life and behavior of the human being, or it changes into a somehow autonomous force, originary force that participates in the life of consciousness and personality influencing it in unknown ways. (Vygotskij 2005: 678, emphasis added)
>
> Das Wesen der Sprache: Die Sprache des Wesens [The being of language: the language of being]. (Heidegger 1985: 170)

In the first introductory quotation, Vygotsky "complains" about the separation of thought and affect that is characteristic of traditional psychology. Even though there are psychological theories of affect and how it influences thought, the relation between thought and affect is always external, one factor influencing another. But thoughts, or rather the words by means of which human beings articulate thoughts for others as for themselves, are only manifestations of thinking beings (Hegel 1979). Similarly, emotions as these are considered in psychology are only manifestations external to the "*being* that is an *expression* of the inner being, the individual posited as consciousness and movement" (ibid: 234). That is, just as during Hegel's time, around the turn from the 18th to the 19th century, and just as during Vygotsky's time, in the 1920s and 1930s, psychologists continue to look not at real persons, caught up as these are in real life, with living motives, interests, and needs. Thought is treated as something that exists in and for itself rather than being a means for coping in/with the real world. Psychologists need to be concerned with "man," who thinks, who "*regulates and controls his brain*"; "*the brain does not control man*" (Vygotskij 2005: 1033). It is therefore not surprising and consistent that psychologists ask their "research subjects" to come to their laboratories, where they disconnect them from everything else in their lives—as if we could understand what a person does and says independent of the different situations where the person participates in and makes societal relations, keeping these and their connections with other societal relations alive. In this text, where

Vygotsky elaborates on the *societal* relations that are the genetic origins of "higher psychological functions," he points out that these higher psychological functions "must be explained not on the basis of internal organic relations (regulation) but in *external* terms, on the basis of the fact that man controls the activity of his brain *from without* through stimuli" (ibid: 1023–1024, emphasis added).

In a similar way, the second introductory quotation is about the relationship between being (in the world) and the being of language. Heidegger uses a colon, which means a stop and then a continuation as if there was to be an "is" or equal sign. If read in this way the phrase then states that the being of language is the language of being. There is, in the way pragmatic philosophers view it, no longer a distinction between knowing a language and knowing one's way around the world. Both are grounded in a primary intelligibility. In this chapter I therefore show that we do not need «meaning» and «mental representation» to understand and explain what is happening when people talk.

Language and life are irreducibly intertwined

These ideas may be immediately applied to our present context concerned as it is with «meaning» and «mental representation (conception)». Rather than explaining talk by seeking recourse to internal organic relations, «mental representations», «structures», and unavailable «meanings», Vygotsky suggests here that we explain phenomena in "external terms, on the basis of the fact that" we control brain activity from without. One such means of control, in fact the most important one that makes humans different from other animals, is the use of language. But rather than explaining language by drawing on inner factors, Vygotsky wants us to consider it as an external stimulus. The pragmatic approach maintained throughout this book is consistent with Vygotsky's call for a *concrete* human psychology. This psychology finds its explanation in the concrete material relations that we partake in and reproduce as members of society and that are typical for the cultural-historical situation of a particular society.[1] This then leads us to a concrete approach to language, no longer explained in terms of «mental» processes and entities—«meaning», «conception», «mental representation»—but entirely in terms of the societal relations that we entertain and, thereby, keep alive. The approach may be seen as kin to the discursive psychology outlined in chapter 5, but in fact leads us to consider activity (*Tätigkeit/dejatel'nost'*) as a broader system producing something important to the survival of society that is intelligible only in its societal relation with the remainder of society. Language is integral to this broader concern for sustaining the individual through sustaining society.

In the frontispiece, I quote Marx/Engels, who suggest that consciousness generally and the words in which it is reflected specifically is the direct consequence of material, society-sustaining activity. It is not just that we know our way around the world but this world is intelligible precisely because we engage in practical activity to change it. Imagination/representation, thinking, and mental intercourse between of people are the result of practical activity rather than the other way

[1] In German, the adjective *gesellschafts-historisch* (societal-historical) is often used as a synonymous alternative to "cultural-historical."

around. In the foundational work of cultural-historical activity theory, A. N. Leont'ev, after quoting the same passage that I present in the frontispiece, provides another quotation, which elevates the contents of the frontispiece text to a more general level: "Precisely the *changes in nature affected by man*, not nature as such and by itself, is the essential and subsequent foundation of human thought, and man's intelligence grew proportionately with his learning how to change nature" (Marx/Engels 1962: 498). The changes human beings learned to bring about, mediated by the means of production they developed, are integral to the societal relations that they entertain. The "knowing" is integral to society, its structural relations, which exist only in and through their concrete realizations rather than being external, as boxes into which human beings step. These are the societal relations that Vygotsky writes about when explaining the origin of the higher psychological functions. These functions are the refracting reflections of everyday life in consciousness. The functions cannot be understood apart from the concrete situations in which these constitute the ideal correspondence to productive material activity (*Tätigkeit, dejatel'nost'*).

We always already find ourselves in a world shot through with intelligibility. This intelligibility expresses itself as sense (Heidegger 1927/1977). When we use expressions such as "this makes sense" or "I know what you mean," then we mark for everyone to hear the intelligibility of the situation. Sense is always already structured by "fore-*having, fore-sight, and fore-conception*" (ibid: 151). It is associated with the object/motive of the current activity in view of which "something becomes intelligible as something" (ibid: 151). Sense, as intelligibility, therefore "is not a property that somehow is attached to things [*Seiendes*], lies 'behind' it or floats somewhere as an 'intermediate realm'" (ibid: 151). That is, in contrast to the metaphysical conception, whereby «meaning» exists somewhere behind are attached to words, a pragmatic approach focuses on intelligibility that arises in, with, and from our activity in the concrete material world.[2]

Some readers may think that the preceding paragraphs constitute ideological talk in its negative sense, a position they have learned to despise as a consequence of the cold war that confronted the Western allies with the countries east of the iron curtain. But we find conative expressions of the relationship between language, the "carrier" of consciousness, and everyday life in Anglo-Saxon philosophy specifically and Western philosophy language philosophy more generally—most notably, of course, in the work of the later Wittgenstein. Thus, the following quotation from the work of D. H. Davidson, subsequently taken up by pragmatic philosophers such as R. Rorty, shows that in the West, too, scholars have arrived at the conclusion of the inseparability of language and life. We may therefore characterize linguistic ability by saying that

> the ability to communicate by speech consists in the ability to make oneself understood, and to understand. It is only when we look at the structure of this ability that we realize how far we have drifted from standard ideas of language

[2] I quote from the German text, which employs the word *Sinn* (sense). The English translation, however, uses "meaning," which tends to be used to translate *Bedeutung* (signification). The English translation is this: "Meaning is . . . not a property which is attached to beings, which lies 'behind' them or floats somewhere as a 'realm between'" (p. 142 [151]).

> mastery. For we have discovered no learnable common core of consistent behaviour, no shared grammar or rules, no portable interpreting machine set to grind out the meaning of an arbitrary utterance. We may say that linguistic ability is the ability to converge on a passing theory from time to time—this is what I have suggested, and I have no better proposal. But if we do say this, then we should realize that we have abandoned not only the ordinary notion of a language, but *we have erased the boundary between knowing a language and knowing our way around in the world generally*. (Davidson 1986: 445–446, emphasis added)

In this quotation—not unlike in the case of Wittgenstein's builder asking her apprentice for the next block to be inserted in the house they are building (see chapter 3)—the ability to communicate is the ability to make oneself understood and to understand. This ability to communicate is exhibited, as I show in chapter 3, in the way the apprentice gets a  ,  ,  , or a  when he hears the sound /blɒk/, /'pılər/, /slæb/, or /biːm/, without being rebuffed by the builder—attesting to the general intelligibility manifesting itself in the ability of the builder to make herself understood and to the apprentice's ability to understand. Davidson points out, however, that this does not require a common core of consistent behavior, or even rules and grammar—in which we could become proficient only through the same kind of societal transactions that also lead to our abilities to communicate. People communicate efficiently even without knowing any formal grammar! Most importantly, Davidson realizes that in such a way of framing linguistic competence, we erase the boundaries between knowing a language and knowing our way around the world more generally. This, therefore, is the very way in which we may frame the relation between the language of real life and the real life of language, which is inseparable from the former (Mikhailov 1976). Most important for the teaching of a language (discourse), such as typified in the language scientists, technologists, engineers, or mathematicians speak, "there is no more chance of regularizing, or teaching, this process than there is of regularizing or teaching the process of creating new theories to cope with new data in any field—for that is what this process involves" (Davidson 1986: 446). The philosopher later continues: "there is therefore no such thing to be learned, mastered, or born with. We must give up the idea of a clearly defined shared structure which language-users acquire and then apply to cases" (ibid: 446).

How then do we learn language generally and any of the (professional) specialist languages ("Discourses") specifically? If linguistic ability is a higher-order psychological function, then Vygotsky would have a definite answer to that question: We learn and develop by participating in the societal relations where the specialist language is an integral part of real life. That is, we learn language by participating in speech activity, which simultaneously produces individual language ability and language as a cultural-historically specific but changing system (A. A. Leont'ev 1969). This immediately allows us to understand that any discourse students learn while being in school, being integral part of real life school talk, will be different than the language that is part of the real life of scientists, technologists, engineers, or mathematicians. This is so because the societal relations and language cannot be teased apart; and these relations, typical of the societal activities in which they occur and which they sustain, are different in schools, in the STEM-

related workplace, and in everyday out-of-school life where STEM-related talk is going on more generally.

Language and laboratory life

As a result of many ethnographic studies conducted within the social studies of science and sociology of science, it has become evident that science is not something special and that it is not at all in the way it may appear from the methods sections in scientific research articles. As a former research scientist and as an anthropologist having spent years working with and observing scientists at work, I know that the life of scientists in their laboratory is pretty mundane. They have the same kinds of needs as other people: They eat, drink, sleep, go to the washroom, talk about family and friends, go to pubs, attend meetings, enjoy themselves fly-fishing steelhead trout in a river, and so on. Their laboratory life, too, is very mundane. They may listen to music while waiting an hour for their eyes to adapt to the darkness of the laboratory, lit only by a faint lamp with light in the far red spectrum; they may talk about what they have done on the weekend, or about how their children are doing in school, or about the fact that the children intend to go to one of the most prestigious universities in the country. Even when scientists are working, for example, appear in transactions with their equipment to collect data or just trying to make it work, their language is not so much *about* the things in their lifeworld as it is one of the means that advances whatever they are doing right now and, in this, advances the overall activity (e.g., completing an experiment to be reported in a scientific journal). It is the activity that produces the laboratory talk;, and it is the laboratory talk that produces the activity. We can observe this in any one glimpse at the events in a real scientific laboratory, evidenced in the following instant in the concrete life of a laboratory investigating the absorption of light in the photoreceptors of coho salmon, one of the five principal Pacific salmon species.

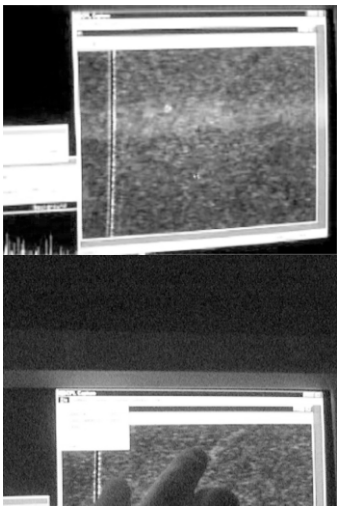
At the time, the laboratory is one of the leading ones in the world investigating, among others, life history changes in salmonid fishes by tracking changes in their perceptual systems in the course of the life cycle of the fish. The Pacific salmon that the scientists are working with at the time are anadromous fish, that is, the fish hatch in freshwater environments, where they grow to a certain size. The fish then leave the freshwater to head for the ocean, where they spend a number of years to grow to adult size, before returning to the same freshwater system to reproduce and die. Associated with the migration are physiological changes that prepare the fish for life in water with different levels of salinity. At the time of the scientific research project, the 60-year dogma suggested that the physiological changes are associated with changes in the chemical composition of the photoreceptors in the eyes from predominantly vitamin-A_2-based (porphyropsin) to a predominantly vitamin-A_1-based molecule (rhodopsin). To measure the amount of porphyropsin in a photoreceptor (cone, rod), the scientists pass light through the cell and, for comparison, through the slide but next to a cell. The difference in the amount of light measured in the two cases is attributed to absorption in the cell.

The language of real laboratory life

On that day, the scientists spent, as they did everyday when they collected data, an hour sitting in the dark laboratory, waiting for their eyes to become adapted to the situation so that they can see sufficient to get their work done. After having sacrificed the specimen, extracted the retina, macerated it, and placed a bit of the crushed material on a microscopic slide, they are ready to begin the search for the cell. But there is nothing other than a grainy image on their computer monitor that is supposed to show the contents of the microscopic slide (image next to turn 01). The scientists are flabbergasted, wondering what has happened since the night before when everything was working. They are looking, pushing buttons, and operating pull-down windows from the program that is supposed to provide them with an image of the microscopic slide. But nothing appears to work. They are literally groping in the dark. This instant presented in Fragment 6.1 constitutes a first changeover in the way the researchers are attuned to the image before them. Until this point, brightness has been the central issue that different speakers noted and therefore made salient to each another, and for which they proposed a variety of solutions or possible causal precedents. Here, there was, for the first time, a new issue: the resolution. In normal operation, the resolution of the image withdraws to be really handy. But when things are not handy, their properties force themselves into the foreground. The instrument and its constitutive parts achieve their character exactly at the moment that they do not work. We can call this the moment when the worldly character of the surrounding world makes itself known, comes and even forces itself into the clearing (consciousness) where it is accessible to our attention. The resolution issue co-emerged with the first, vague image of a cell, barely visible in the noise, but enough to be pointed to and out by means of a gesture.

Fragment 6.1a

01 T: * `okay I brighten it right here.
02 C: thats not it.
03 T: <<p>´how about this; do you see this one right here.>
04 (2.31)



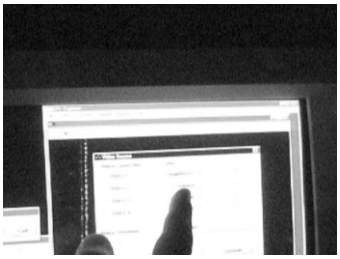
05 you see right * ⌈here.
06 ⌊((*Moves finger back and forth along screen where there appears to be something in the noise*))
07 C: `yea i know but the resolution is (0.69) really bad.
08 T: yea.
09 (1.54)
10 okay.

Let us begin by considering *what* the scientists are saying and *how* they are saying it. Fragment 6.1 begins with the formulation of an action as a change in the image by modifying brightness (turn 01); but the next turn suggests that the change made "is not it," that is, it could not have addressed the central problem. Theo says that there was something to be seen, but there is a conversationally long pause, and neither of the other two lab members present gives a sign that he has seen what has been referred to "see this one right here?" Theo then speaks again. This turn sequence, followed by the statement "yea I know," thereby constitutes the pause and lack of acknowledgment as a sign that others do not understand. The statement then not only reiterates the indexical reference "right here" but also uses a gesture to point to and move along monitor where he saw an entity (turn 05). That is, this communicative production is the second part of a turn pair, the first one being a long pause where a second turn to his preceding statement (turn 03) might be expected to occur. That is, the next turn does not treat turn 03 as a question, as the grammatical structure of the statement might lead to suggest. Rather, there is a question/invitation to see that requires an answer, something like "yes I see" or just "yea." Both words (turn 05) and gesture (turn 06) then contribute to making a statement, which constitutes a pointing out that communicates and defines.

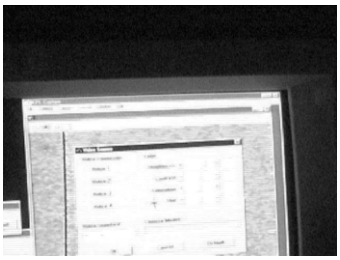
By saying, "Yea, I know" (turn 07) Craig acknowledges that he is seeing whatever "this" is; but he then articulates «the problem» in a new way: "the resolution is really bad." Theo, in turn, can be heard to «acknowledge» the comment (turn 08), and can be seen as searching for something in a pull-down menu (lines 10–11). His action selects a particular window, but the statement explains that he could not set the contrast to brighten the image—Theo's hand moves across the position where the modifications could be made (turn 12–13). Subsequently, and as if he were speaking to himself, he also describes the present situation as offering too many options to select from (turn 14). He not only makes changes but also articulates them in words: "increase contrast" and "brighten." His actions are accompanied by changes in brightness and contrast but the image behind the window remains as fuzzy as it has been. Craig now can be heard to make a statement about there being "too much noise" (turn 19), consistent with an earlier statement about a poor ("bad") resolution. The next turn accepts this statement.

Fragment 6.1b

11 (8.71) ((*Goes to a pull down menu, which opens a new window.*))
12 i * cant set the ⌈contrast to brighten it.
13 ⌊((*Moves hand across the window at the place where settings can be changed.*))



14 <<p>yea we have more than one to select from it.>
15 increase contrast–
16 (1.84)
17 brighten–
18 (7.39)
19 C: * nOW (0.20) there is too much noise.
20 T: yea.



In the course of their data collection, there were other moments when there was "nothing" on the screen, when there was nothing but "noise." But the scientists learned to attribute that particular part of noise to the fluid in which the retina is suspended or to some other part of the instrumentation. In the present situation, the "noise" was more like that of a television monitor when there is no signal on the cable or when the channel is slightly mistuned. The scientists do not know the source of the noise. So they cannot intentionally orient towards finding it. Their exploration, their search for something that both will change and explain the situation, is part of process of providing a clearing, in and from which entities come to emerge until one of them—hopefully—comes to make the difference.

When there are problems during the research, here as elsewhere during their research, the laboratory members never engage in the kind of searches that psychologists and cognitive scientists talk about, where the problem solver searches a known problem space for specific and specified items—similar to someone searching for a particular knife or pot in his or her kitchen. The present situation is rather different; it is a search for something that the participants do not even know what it is. As Theo says elsewhere during the episode, he does not think that they have changed anything since the previous day. Yet the image they are looking at *is* different. The process in which the researchers thereby are engaged is more like groping in the dark—they literally are in the dark where the groping is going on—when we find ourselves in an unfamiliar place in complete darkness. All we can do is move about without knowing into which direction we have to move to change our situation. At the outset, any direction is as good as any other one. There is no way that we can judge whether or not a particular movement, a particular direction, or a particular action is more or less successful in getting us out of the situation. But through our actions we clear a field, constitute a clearing, and begin to separate figure from ground. The sense that emerges is pre-figured by intelligibility as a possibility. The situation eventually can make sense because intelligibility is already a possibility. This possibility disappears as such when it comes to be realized. Realization, therefore, also means destruction of (mere) possibility as such. There is a general sense of what the overall outcome ought to be, and there are certain constraints to the actions given by the material conditions of the situation. But there is no map or gradient (as in the games where we are told "hotter" and "colder") that could help us identify if or when we are close to narrowing the gap.

Eventually Craig can be seen to be completely frustrated. Already he has "lost" an hour trying to get the instrumentation to work. The unfolding activity and with it the speech activity that participants engage in cannot be disconnected from the

larger context: that of human beings with their emotions, physical states, and so forth.

In the end, the problem suddenly disappears as one of the software settings, after being changed, brought about the desired image. Immediately prior to that instant, Theo describes for the first time the real change that has occurred since the previous day: "Maybe it's a trouble with the large screen." Here, "large screen" did not mean "large" in absolute terms. The "large screen" stands in contrast to the smaller screen that they have used on the previous day; the significance of the denotation becomes clear only in this historical perspective. Up to that point in their work, they have used a smaller computer monitor, for they only had displayed the graphs before, whereas one researcher has searched for suitable cells on the microscopic slide by looking through the ocular of the microscope. The scientists decided to replace the ocular with a CCD device, the image of which they see on the computer monitor currently connected to another computer in another lab. Articulating the large screen and thereby bringing it into the clearing—i.e., turning the ready-to-hand into something present-at-hand—changes the way in which they are attuned to the situation and quickly resolve the issue. Such attunement presupposes intelligibility: I am in tune with what makes sense, even with its opposite, non-sense; but I am not in tune what completely lies outside of sense. Once the image on the screen is in the way they want it, the scientists continue as if their problem had never existed, as if they had not spent 15 minutes struggling to find how to get their CCD image to show up on the monitor. But with the disappearance of the problem, therefore, that which had been in the foreground receded to hide itself again in its ready-to-hand everydayness.

The real life of laboratory language

The language that these scientists use is an integral part of the exploration activity; it primarily constitutes a form of action, with an intentionality of *in-order-to*, rather than a representation, with its intentionality to be *about* something. It is a resource for pointing out some things, making them salient, and aligning others to one's own ways of being attuned to the field. When speech activity appears to be insufficient, participants also have available gestures as means to point, encircle, or iconically articulate an entity. That is, we have to analyze communication rather than speech alone. The totality of ways in which the scientists exhibit to each other intelligibility, including their non-talk when things are passing by on the screen, is integral to the movement of the activity as a whole. The speech activity is part of being attuned to rather than a «representation» of a world separate from the individuals engaged in the search for the causes of the "different field." The structure and content of this communicative activity cannot be understood outside of the activity as a whole, because the research activity gives rise to and moves long the communicative activity in the laboratory; and the communicative activity gives rise to next actions and moves along the research activity. The real life of language is speech activity; it therefore is irreducibly tied to the research activity generally and to the current goals and actions more specifically.

The videotapes recorded in the laboratory in the course of the scientists' investigations also show some interesting features pertaining to communication. There

are relatively long pauses between two speakers—up to 30 seconds long. This is significant, for there is a considerable disciplinary history of analyzing conversations, particularly pertaining to turn-taking patterns, repair, function of pauses and overlaps, and so forth against which these pauses need to be seen. In the laboratory work I observed, many of the reported patterns do not hold. For example, there are long pauses when the participants do not speak, there are frequent questions and statements that arise seemingly from nowhere. Unlike other conversations often analyzed in the literature, this one here is not an activity in itself but is part of the day's work of collecting data. The temporality of language use and turn taking is subordinated to, or rather, an integral part of the intelligibility of the total situation to which the participants are attuned. The purpose of the current actions in the ongoing research activity is to produce the data for an article, and the goal for the present day is to produce such data. Talk exists in so far as it assists in moving the system toward that goal. Because the participants are co-present to each another, which gives them equal perceptual access to the material situation and to one another; and because they have a considerable history of shared collective activity, there are many things that go without saying. Words and statements contribute to moving the activity along, to bringing light to the clearing, even if these do not constitute well-formed sentences and even if these do not constitute complete representations—whatever the statements might be said to refer to. What is transforming is not the topic, as moved ahead and transformed by the verbal contributions, but the laboratory activity as a whole. Because members are attuned to the relevant aspects of the setting, those aspects that go without saying do not have to be, and in fact are not made, salient, for "statement is a pointing out that communicates in a determinate way" (Heidegger 1929/1977: 156). Not talking generally occurs when the participants have the sense that they know what is going on and that they assume it is the same for others. It is only when someone has the sense that a common ground does not exist that communicative action begins.

Communication is more than what people say. Participants are attuned to the setting and the fundamental assumption under which they operate is that others are attuned to the setting in the same way that they are. Scientists can sit in the laboratory, watch a computer monitor where images go by and know that they are in tune and that others see what they see all the while being completely silent. The changing world itself is communicating (Roth 2004b). It is only when there are discrepancies, when there is evidence that the assumptions are not fulfilled, that participants engage in repair to return the situation to be consistent with the assumption. Communication is more than what people can say in another sense as well. When Craig says, "What's *special*?," this is not just asking a question but also indicating that he does not know. One might ask, what does Craig mean? "What is special about what?" Here, *special* is a word that appeared somewhere on the screen. The two other participants in the setting are attuned to the screen in the same way as Craig. What is special can therefore be heard as a question about the word special: "What does the word 'special' that appears on the screen denote?" In fact, it is in the turns of the others that Craig's statement becomes a question paired with the reply-constituting statements of others.

Laboratory communication, verbal, gestural, or otherwise therefore has at

least two functions that we need to consider simultaneously to understand "the life of language." One is to point out something may have not been noted by another person. By the very fact that this something can be pointed out reflects the possibility of its intelligibility. With each communicative act, members to the setting make salient to and for others things. These things are already intelligible by the very fact that they can be pointed out. Things, articulated (differentiated) from their context are articulated in language—the two articulations (seeing, speaking) are the two sides of the same coin. "*Logos* [speech] lets something be seen (*φαίνεσθαι* [phainesthai]), namely that what is talked about and for the speaker (the medium), and indeed *for* the interlocutors" (Heidegger 1927/1977: 32). Second, the communicative act also functions to reassert and thereby maintain the same attunement to the situation and therefore to the current state in the unfolding of the events. The longer the individuals in this laboratory worked together, the less talk there was—which my videotapes, recorded over the 5 years that I spent in this laboratory, amply document. That is, communication cannot be seen and interpreted to constitute a momentary phenomenon but requires historical analysis. When co-workers do not talk, this does not mean that nothing is going on and happening.

The data also show how affect is deeply integrated with language production. In fact, each verbal production has both semantic and affective aspects, as we can hear in the voice when Craig gets frustrated, and we can hear in the impassionate voice of Theo that it is for him just another day in the laboratory, where things can go wrong. Craig does not have to reflect and think about what to say and how to shape the sounds that come from his mouth: what he says and how he says it is integral to the life in this laboratory, including the content of the talk, the way in which they talk, and the affective aspects that we hear them articulate simultaneously.

Language and school life

As a productive activity advances, so does the communicative activity (language game) that is an integral and constitutive part of the former; and with advances in the communicative activity, the productive activity also advances. That is, speech activity is producing societal activity, and societal activity is producing speech activity. But, as we see in the preceding section, activity is also reflected in and produces, as another form of consciousness, affectivity: emotion literally is at work (Roth, 2007). Thus, as the actions that realize the activity unfold, affect is continuously transformed into affect, sometimes shifting from elation (e.g., when a student has the sense of understanding) to frustration (e.g., when a teacher feels that what she has been doing in the attempt to assist a student has not led to the desired results) (Roth, 2013b). In the following example from school life, we see how the affective side develops together with the activity, itself developing as a result of speech activity, which, in turn, develops as the result of the advancing schooling activity. This speech activity, here, therefore does not only concern mathematics but also schooling more generally. Speech activity simultaneously produces schooling activity, societal relations, and mathematics talk.

The language of real school life

The present example has been recorded as part of an innovative mathematics curriculum, which provides fourth-grade students with opportunities for developing early understandings of algebraic notions.[3] The transcribed lesson fragment was recorded on a day when the students were working on a story-based task. The story features a girl who receives a piggybank and $6. She decides to save $3 each week. The students are asked to model the situation for the first six weeks using goblets and colored chips (a different color for the first $6 than for the subsequent $3 each week) and then to fill up a prepared table of values that the designers of the curriculum hoped would encourage the students to move from noting the dollar amounts added (3 + 6), (3 + 3 + 6), (3 + 3 + 3 + 6) . . . to a multiplicative form (1 x 3 + 6), (2 x 3 + 6), (3 x 3 + 6) . . . for each of the weeks 1, 2, 3. . . . As a way of affording this task trajectory rather than any other possible one, the table of values already contains some numbers and signs: those underlined in the preceding sentence.

The students seen in the video—Mario, Alyssa, and Thérèse—have been working for a while, but they begin to be stymied after having filled the goblets with the dollar amounts for each of the first six weeks (see goblets in offprint that goes with turn 80a) and just as they begin filling up the table. One of the three students seen on this video, Thérèse, is humming along, an expression confirming that she appears to be fine. (The other two students, Mario and Alyssa do point out that Thérèse appears to know what they are required to do.) Alyssa, however, has already come to a point where she says she does not understand and that she will never understand. Mario alternates between trying to move on and trying to get the teacher's attention. Eventually the teacher (Jeannie) comes to the table and, after Mario has said "Look, this is dumb" in response to her query how they were doing, begins to engage especially with Mario. The fragment begins after Jeannie has asked Mario about the contents of the piggybank at the end of the first week, to which he has answered "nine."

In repeating what Mario has said with a constative intonation, Jeannie's turn affirms that the amount is 9 (dollars) for the first week (turn 69) and, in continuing, her turn offers up what can be heard as a query: "Why is the three in yellow?" Mario produces an interjection, shrugs his shoulders and shakes his head as if saying, "I don't know" (turn 71). That is, in this ordered turn sequence, we observe an irreducible query|reply unit. Thérèse does state that she does not know, and Mario, who is beginning to talk simultaneously, suggests and offers as a question that it is because they are supposed to write it (turn 74). We then hear Jeannie utter a translation of the preceding query, which has concerned the reason for the three (chips?) to be yellow, to the origin of the "three" (turn 76).

Fragment 6.2

69 J: it EQuals to nine the first week. (0.78) wHY is the thrEE in yellow. whydyou think. ((*Index finger on table*))
70 (0.19)

[3] An extensive, cultural-historical activity theoretic analysis of this mathematics lesson is available in book form (Roth and Radford 2011).

71 M: um um, um ((*Shrugs shoulders, shakes head 'no', questioning look.*))
72 (0.20)
73 T: <<all>i don [no]>
74 M: [be]cause we are supposed to write it?
75 (0.44)
76 J: WHEREe does the thREE come from.
77 T: donno?
78 M: <<f>a:=u:> (0.24) u:: (0.17) u: dududu: wedding thing there?
79 (0.76)
80a J: <<exasperated>buthh * ((*turns head away from Mario*)) (0.14) the three dO:LLas? is wHAT exACtly?>
80b * ((*Mario, who has looked at her, grimaces in desperation, brings his hands up and covers face*))

As before, Thérèse states not to know and Mario suggests, switching between the French language that they have been using so far and English: "the wedding chose [thing] là [there]" (turn 78). There is a brief pause, and then we hear an exasperated "buthh"—as the "hh" shows, there literally is exasperation—upon which Jeannie turns to look straight into the camera (see offprint in turn 80a), as if she had been caught in doing something that she does not normally do (or that teachers are not supposed to do). She continues, producing another translation of the query concerning the three dollars: "the three dollars is what exactly?" (turn 80a). But Mario grimaces as if in desperation, brings his hands up to the face, which he then completely covers with the palms of his hands (see offprint in turn 80b).

In this fragment from school life, we see how participation in schooling activity, whatever the present affective state, produces affect, here with negative tonality, and changes therein. This is apparent in the exasperation and frustration that is exhibited in Jeannie's voice and in the fact that she is apparently checking on the camera and its operator who have recorded and overheard her reaction. Mario also makes available for everyone to see and hear that he noticed this frustration, his evaluative turn exhibiting what can be seen as an expression of desperation (the way he covers his face). That is, the two make available evidence of their affect and, therefore, of how what they are doing is affecting them.

We witness here an everyday situation, where the actions of the members to the setting move the schooling activity along all the while being or getting stuck. As in the saying "one step forward, two steps back," any step both moves the schooling activity ahead and retards it, because both kinds of steps realize the schooling activity even if it is in a temporarily retrograde movement. The retrograde movement is integral to the overall movement, just as the turbulent back-

ward flow in a river is part of the general movement of the river: to the ocean, a lake, or simply into the ground. Affect is integral to this movement. Affect is a reflection of this movement, and, therefore, expresses and manifests a form of consciousness of the activity—though different from the verbally mediated consciousness that is privileged in (educational) psychological and associated STEM discourses. This ebb and flow of talk and affect is integral to the realization of this mathematics-related schooling activity, which, in turn, produces the ebb and flow of talk. *This* is the language of real life in a classroom. This life is not just about the cognitive contents of talk. It is not just about ideas. Rather, it is constituted by the societal practice of doing schooling, teaching, learning, frustrations, exasperation, and so on, all playing an integral part in the schooling activity as much as the colored chips, goblets, paper-based tables of values, pens, chairs, tables, and physical classroom.

The real life of school language

We observe a transformation of the language of transaction when what has been uttered apparently does not advance the situation to whatever may be the anticipated end state. We clearly observe the movement in the talk. First Jeannie's turn states "Why is the three in yellow? What do you think?" (turn 69); then she utters "Where does the three come from?" (turn 76); and finally she voices "The three dollars is what, exactly?" (turn 80a). We note that in all three locutions, the "three [dollars]" appear thematically. In all three locution, the pitch contour points to the offering of a question, and the next-turns, all falling to Mario, accept these offers by countering with the offers of a(n) (tentative) answer. All three locutions clearly are oriented toward Mario, as per Jeannie's bodily orientation and gaze directions that can be seen as selecting him as the intended recipient; and all three are first parts of pairs in which Mario's locutions constitute the second parts. There is a change in language and in the things in the setting that are made salient in and through the talk. The first statement asks about the reason for the "three" to be in yellow. The second statement asks about the origin of the "three." The third statement asks about the nature of the "three dollars." We therefore see that although all three statements have threeness as their topic, the latter is actually changing as the situation unfolds in time. This changing language is equivalent to the life of school language in *this* situation, but, though there is not enough evidence for making a definitive statement from the current videotape, it is also important in the life of this teacher. I elaborate on this.

If Jeannie knew what the current problem is, she could have said what is required to get Mario back on track. The fact that she does not do so on the first trial but apparently has to look for a way of asking her question shows that she, too, has to figure out something, learn how to address *this* problem at *this* point in time. The changing language evidences both the search and the learning process, which both will have come to a conclusion once Mario has answered. He has to have answered in a way that will lead to the continuation of the trajectory toward eventual completion of the worksheet, on the one hand, and, hopefully, some evidence of comprehension on the part of Mario, on the other hand. This language that we observe, being the result of the current speech activity, has to be theorized

in terms of its double belonging to schooling activity and the goal of the particular mathematical task that realizes the former. The speech activity develops together with the overall schooling activity; and it does so in the form it is realized at the present instant.

This fragment contributes to the discussion about the existence and usefulness of «meaning» in an important way. We can hear Jeannie repeatedly ask about the 3 (dollars), as if Mario had said, "What do you mean (like)?" This is precisely what videotapes shot in another, mathematics classroom in another part of Canada showed, where the teacher «reframed» a question repeatedly when her student either asked "What do you mean like?" or when there was a long pause without reply, providing the teacher with another opportunity to take the floor and «ask the question» in a different way (see chapter 7). If «meaning» had been something accessible, Jeannie, as Mrs. Winter in chapter 7, could have articulated it right away. But the fact that the question "What do you mean?" or any other transactional form that has the same effect—the repeated re-framing of a question—then tells us something about how to think about «meaning», if indeed we are desperate in wanting to retain this notion. I develop one such possibility in chapters 7 and 8, where the totality of ways in which Jeannie—or my other teacher—might possibly respond to the question "What do you mean like?" constitutes «meaning». In the present instance, the student-uttered query followed the first locution "Why is the three in yellow?" We might use this as documentary evidence for (concrete manifestation of) the «meaning». The «meaning» of Jeannie's response, thereby, would exists in and of the totality of ways in which her statement may be rephrased while assuming that it is saying the same. This «meaning» is only ever available in these concrete manifestations—much like the nature of light is available only in and through its manifestations: either wave or particle. Put I return to this issue in subsequent chapters, where I give it a more extensive development.

At this point, we may also take a comparative look at the speech activity—i.e., the language games at play—in the school example and at that in the scientific laboratory. We note that there is a structural difference in the sense that the definitely ordered turn taking in school is characterized by the teacher taking the first position, in which a question appears, and the student takes the second position, where there is a reply. In this episode, the sought-for answer has not yet been produced, so the typical evaluation and change to the next topic has not yet occurred. In the fragment from the laboratory, there is no such sequentially ordered question|reply pair. Rather, there are statements, queries, propositions that move the search for the problem along. In the schooling activity, there is a definite answer. The "three" pertains to the amount of money that is saved each week. Jeannie knows it. She has designed the task together with the researcher who had planned the study. In the laboratory it is not only that the people search for an answer: they do not even know what the «problem» is. Framing the «problem» so that it can be solved is their *joint* task to be solved transactionally. In the school, it is the production of the already known answer that is to be achieved transactionally. The task appears to be clear, at least to Jeannie. But there is a problem: Jeannie and Mario appear to be stuck, as shown in their affective evaluations of the situation. The nature of the «problem», however, is not clear in the same way that the nature of their «problem» was not clear to the scientists. Thus, in each case the

case the communicative activity we observe serves to move along the activity, which in turn moves along the communicative activity (in a forward or retrograde movement). But in the two settings, there are very different, societally mediated organizations in which the transactional work is accomplished; and there are also very different object/motives to be realized. This is reflected both in the content and in the structure of the communicative activity that moves along the overall activity as it moves itself along, and which is moved along as the overall activity advances.

The real life of language is its irreducibility from the language of real life

In STEM education, there is a tendency to consider school as something different from other aspects of life. This is clearly evident in such theoretical notions as *third* or *hybrid space*, where students are said to cobble together the school-related discourses and identities—something like "second space"—and those that are characteristic of the situations around family and friend—something like "first space." We find an instance in chapter 2, where I analyze the data from an Australian chemistry classroom. There the authors focused on the fact that they observed informal language while students were completing chemistry tasks. Theorized in this way, students are then said to be boundary-crossers, moving from "home culture" to "school culture," and to be creating a "hybrid culture." There appears to be little consideration that from the perspective of the students, school is just as much part of the fullness of life as being with friends in the skate park, with family on a holiday trip, or shopping for clothing (Roth and van Eijck 2010). Students do schooling in the way they do these other things. They are likely having preferences with respect to participating in the different activities (*Tätigkeit, dejatel'nost'*); and, for some or even many, schooling may well be at the bottom of the list of common activities. Thus, although they participate in the activity of schooling, the object/motive of this activity may not be high up in the hierarchy of object/motives that make the personality of the student.

At any point in time, one activity and object/motive may be dominant, but this does not mean that the others are not equally salient. We may observe someone shopping for clothing and simultaneously talking on the telephone to a family member, friend, or co-worker/boss. That is, although a person participates as a consumer in a shopping activity, s/he simultaneously engages in the relations that maintain another activity system. A parent at work may call home where a child is staying home sick to see how s/he is doing. At any instant in time, we may think about and organize what we will do next, within one or more other activities that we commonly participate in, such as when planning to go out for dinner with a colleague who also is a friend. We well know that students not only go to school but also maintain their friendship circles, both within and between their scheduled classes. Thus, rather than conceiving of boundaries, we ought to think about the integration that occurs in everyday life, one aspect of which may be more or less favored or even be hated. Yet participating, however much one subscribes to the object/motive, means sustaining and transforming the activity.

For these reasons, I suggest that it is more useful to theorize participation in

any form of activity as connected to participation in all other activities. We always participate in *life*, though some parts may be more salient than others. That is, we do not cross boundaries but are present in and to life, parts of which manifest themselves at any one point. At any instant, we may then observe evidence that people engage in these other activities, realizing their object/motives, all the while remaining physically in the location that is characteristic of the currently dominant activity. This, then, makes for the multi-voicedness of life, where the forms of talk characteristic of one activity surface while participating in another activity. In fact, any locution has the potential to realize multiple object/motives, belonging to different activity systems, so that making reference to the leadership of a peer during the physics course using the word "Führer" (German for "leader," but also used to denote Adolf Hitler, who used the noun as a title) resonates another conversation that these students have in another place and time or in multiple places and at multiple times (Roth 2009b). This is the case in the following example, which features a fragment from a physics course.

The multi-voiced nature of life

This classroom example was recorded in a 12th-grade physics course of a private school ("college" in the British tradition), which, at the time, was for boys only. Although the activity for the students would still be schooling, in this particular case the purpose was to prepare them for college or university entry. The teachers at that school were certain that the student body was no different from those who attended the "better" of the surrounding public schools—but they tended to come from well-to-do families that could afford the high tuition and boarding fees. The particular task that the students completed was a concept map using a set of given terms printed on 1" x 4" paper slips that I, their teacher, had provided them with. The students were to arrange these terms from the most inclusive to the least inclusive, building something like an inverted tree structure, which they then transferred to a large sheet of paper (11'' x 17'') where they also drew the branches between the terms and wrote linking words along these links (see, e.g., Figure 5.8, p. 128.)

The fragment was selected such as to show that besides the concept mapping task-related talk, there was other talk going on. In fact, there is evidence of a continuing conversation that spans weeks and different occasions (dorm, chapel) between two of the protagonists, who accuse each other, part in jest and part in seriousness, of racism. At the time, I had omitted this and other bits from the transcript that I analyzed for research purposes because I considered these to be—as my colleagues elsewhere—"off-task" conversations. I realized only many years later, once I had read an analysis of F. Rabelais' novels (Bakhtin 1990), that these are forms of talk suppressed and repressed in school situations—much like the Church repressed certain forms of talk and behavior during the Middle Age (Roth 2009b). It is only under certain circumstances that the plenitude of everyday talk is allowed to come to the fore—in the Middle Age, it was during the times of the feasts, in schools it tends to be during "fun 'activities'" or during small-group work where teachers tend to be a little more lenient with the kind of topic and language that they will allow. When the fragment picks up, Miles, Ralf, and Ken (from left to

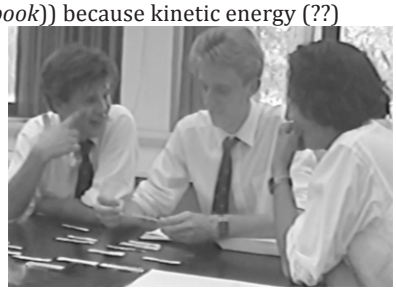
right in the offprints) are in the process of talking about where to place, in their beginning hierarchy of concepts, the term "Planck's constant" (turn 132). As the give-and-take shows, there appears to be agreement that the term is "pretty important" (turn 134), because it "practically deals with all of" the terms (turn 133). There is a proposal to place it under "complementarity," which is currently the top-most term. There is also a statement about Planck's constant being "connected" to "kinetic energy," which is "Planck's constant times frequency" (turn 136). Then, all of a sudden, Miles, who had come late to class, addresses the teacher «asking about» the recording of the lesson. And then there is a statement that in this way, "Ralf the Führer" would be recorded (turn 136a). Miles clearly is oriented toward Ken, as if waiting to see whether this statement has an effect (see offprint in turn 136a).

Ken can be seen and heard to reply to the statement and to Miles' gaze with a chuckle, and Miles chuckles in turn. The next statement returns the accusation/insult with amplification: the addressee. Accordingly, Miles is "the biggest racist here in school," which is taken up as having already been discussed and that the preceding speaker has "been racist" (turn 136f). There is an invitation to go on, and, Ken's hand held like a dividing screen (offprint associated with turn 136f), as if separating two contestants.

Fragment 9.3

132 M: okay, where are we gonna toss plancks constant?
133 K: it deals with practically all of them.
134 M: its gonna be on top, because its pretty important.
135 K: under complementarity.
136 R: its connected, see kinetic energy is either plancks constant times frequency or electrons or ((*looks into book*)) because kinetic energy (??)

a M: ((*turned toward teacher*)) uh are you recording with this one? uh i didnt know ((*turns to Ralf*)) its like ((*hand movement as if slapping with back hand*)) this is like ((*points to microphone, then looks at Ken*)) recording ralf the * führer ((*points to microphone*)) ((*Miles and Ken both chuckle*)) ralfy the racist, now you- ralf the racist.



b R: you are the biggest racist here in school.
c M: we have been discussing this, you=ve been racist.
d R: i should=ave mentioned-
e M: ralf, who said- listen
f K: * ((*hand forward as wanting to separate them*)) <<calming>let=s go on>

g M: listen a sec. listen ((*oriented toward Ken, throwing his hand forward*)). you can decide on this. * ((*Sideward glance to Marc.*)) in my chapel speech-

h R: you are talking the whole hour about racist stuff. nothing i have said is racist; nothing racist about it.

137 K: what is pair production up there?
138 R: its the creation of matter.
139 K: where would matter waves go, though?
140 R: matter waves is, for example, an electron if it travels or even when we=re-
141 K: no, i understand now, wouldnt it be right under this? complementarity theory because thats like quantum?

However, the next turn continues, inviting Ken to whom gaze and hand are oriented, to make a decision. Moreover, as seen in the associated offprint, there is a glance at the student (Marc) sitting near the camera at the next laboratory table, as if looking for the impact that the discourse is having on the other (turn 136g). It is a literal enactment of the sideward glances detected in the double-voiced speech of some of Dostoyevsky's heroes and in polemical discourse. Thus, "internally polemical discourse—the word with a sideward glance at someone else's hostile word—is very common in practical *everyday* and in literary speech, and has enormous style-shaping significance. Here belong, in everyday speech, all words that 'make digs at others' and all 'barbed" words'" (Bakhtin 1994: 411, emphasis added). In this example, therefore, in the midst of everyday speech in the school classroom, we observe a feature "very common" in everyday speech, though, from the perspective of schooling, these students currently engage in "off-task" conversation. There is in fact no boundary or transition from talking physics concepts to talking the language of everyday life, with all of its inflections, here, the sideward glances reflecting polemical discourse of two adversaries, who mutually accuse each other—in jest and with seriousness—of racism.

Following the statement that Miles has uttered about having previously addressed racism in his chapel speech[4], Ralf's turn acknowledges that this has been the topic ("you are talking a whole hour about racist stuff") but then denies that anything he himself has said was racist (turn 136h). The episode ends with Miles' laughter while gazing at Ken as if checking his peer's expression and with a light smile on Ralf's face. As quickly as it has flared up, the topic of racism disappears when Ken offers up a question about the placement of "pair production," which Ralf takes up in stating that it pertains to the creation of matter. Ken offers up another candidate for a question|answer turn sequence, which Ralf's turn completes as a statement that apparently explains the term (turn 140). Ken states to know now, and makes a tentative (i.e., with rising pitch that marks a question) statement concerning the placement of the term "right under complementarity [the-

[4] In this school, there is an obligatory ecumenical morning service for all faiths that begins the school day and each week there is a chapel speech by one of the senior students.

ory]" (turn 141). As there is no attempt at the time to return to the topic of racism, to keep it alive by continuing to talk about it, it is de facto abandoned and, for this instant, dead. My recordings show, however, that there were at least three instances in this lesson with exchanges between Miles and Ralf concerning the issue, with accusation and counter-accusation, argument and counter-argument about who is more racist, and so on. That is, there is a continuing conversation about racisms that the two return to without any transition, as if it were a second simultaneous conversation marked by longer interruptions.

The multi-voiced nature of language

In this instance, the students move from one topic of speech to another without signaling any transition whatsoever. It is apparent that they do not require a signal that a transition has occurred or is in the process of occurring. As soon as Miles's turn offers up the possibility with his statement to enter another topic, one that they apparently have been discussing at other times, and as soon as Ralf's turn takes up this offer, the topic has switched. The two turns are part of the same unit of analysis. In its movement, it incorporates a topic *switch* and an offer. There is no boundary or border that the students would have crossed: they seamlessly move from one topic to another topic and back. The conversation is in one key at one instant and in another key at another, the transition itself undecidable, and therefore syncopic in nature. It is apparent that there is an alignment with respect to the topics and the shifts between them.

The lesson fragment shows other features characteristic of the multi-voiced nature of everyday life, the language of real life. For example, both the "accuser" (Miles) and the "accused" (Ralf) relativize the seriousness of the content of the word by means of smiles and laughter, which disrupt and undermine what on paper might be considered to be challenges to the integrity of the other. They use each other's words to charge and counter-charge, challenge and counter-challenge, and argue and counter-argue. But our competencies with everyday life allow us to experience (hear, see) the irony that is written over the entire fragment of classroom life. Together with their talk, the two make available the *how* of their speaking; and it is the *how* of their speaking that determines the *what* of their speaking: it is not a serious accusation but much of it is jest. For example, Ralf's turn offers up irony in his statement about Miles spending "an entire hour" to speak about racism based on a single comment. It appears that for the moment, this statement is accepted, as there is no counter-word that would take up the preceding statement. Whatever Miles may be thinking in private at that instant, in the public arena, there is no counter-word and, therefore, the statement is de facto accepted. This does not mean that the issue cannot be taken up at another instant to be further elaborated, discussed, or argued.

With this analysis in view, we may consider again the analysis of the episode from the Australian chemistry classroom featured in chapter 2. In their analysis, the authors do make note of the everyday talk. But they do not theorize the event in terms of the overall life of the students. The authors do not take note of the inherently affective character of talk, which, in their situation, might arise from the tension between denoting something as a grammatical issue and their presence in

a chemistry lesson, which is not normally concerned with issues that tend to belong to language-oriented courses. There may be irony, criticism, hurt, and so on; but these affective tonalities present in any situation of real life do not tend to appear in STEM analyses of classroom discourse exemplified by the study of the Australian chemistry classroom.

Irony and parody are integral parts of the fullness of life. These speech features may make use of another's speech but, even if the very same words are used, these are different, consistent with the unfolding of the theme that is in continuing development.[5] Accordingly, the words inherently are different: they are produced to convey aspirations opposite and even hostile to the previous speaker. Thus, "in the ordinary speech of our everyday life such a use of another's words is extremely widespread, especially in dialogue" (Bakhtin 1994: 93). It is precisely in dialogue that "one speaker very often just repeats the assertion of the other speaker, investing it with new value and accenting it in his own way—with expressions of doubt, anger, irony, ridicule, intimidation, and the like" (ibid: 93).

In everyday out-of-school life, there tend not to be forces suppressing full expression, which makes everyday speech in many instances inherently dialogical. In schools, however, any topic other than that pre-specified according to the official daily plan—e.g., mathematics from 9–10 am, science from 10–11 am, and so on—is suppressed, which lends school talk its monologic character, where single truths are to be developed (van Eijck and Roth 2011). Outside schools, however, abuse is common; and it does not only go one way. Between equals, there is a constant give and take. There is, in Bakhtin's sense of the word, true dialogue at work. In Bakhtin's work, the marketplace is the chronotope (i.e., time-place) where such societal relations tend to occur. But the "marketplace" could be any physical location of interest, generally where there are lots of people, and where there is a lot of come and go, such as on doorsteps, in entrance halls, in taverns, in bathhouses, or on ship decks. The marketplace is a location where words, as things, are traded. When things are traded, they have use-value and exchange-value, both being manifestations of the dialectical "value." In a similar way, when words "are traded," there is an equivalence of "value" (*značenie*): signification (*značenie*). Just as the changeover in a commodity from exchange-value to use-value integrates and distinguishes seller and buyer and pre- and post-exchange situations, the changeover in a word constitutes the different signification it has in space (for author and recipient) and in time.

The verbal as the economic exchange forms one unit that expresses itself in contradictory ways, each presupposing the other: buyer and seller, use-value and exchange-value, speaker and recipient, and the word in the mouth of one and in the ear of the other. As a result, the exchange of words occurs in a continual dialogical relation between material and ideal aspects of life and in places where others are present—like Ken and Marc, who may overhear what is being said between Miles and Ralf. In the lesson fragment, the carnivalistic marketplace where *total* life finds its expression is the classroom, co-inhabited by and with others (including the teacher), who hear what is being said. In this instance, what is nor-

[5] As pointed out in chapter 1, the theme (*tema*) is the upper limit of word-signification, the lower limit of which is dictionary sense of the word (Vološinov 1930).

mally banned from school discourse occurs: teasing and abuse. And these are not merely directed toward another person—Ralf and Miles, respectively—the recipient of the abuse. Rather, the word is also direct toward the generalized other, the Other who is witnessing the scene. It is precisely because the potential effect on this generalized third person in the scene that the abuse functions as it does, where it takes on symbolic value. This orientation toward the generalized other—who is the intended or unintended witness to the exchange that is of a type common to everyday societal relations—also is evident in the present lesson fragment.

Speech activity as irreducible part of societally motivated productive material activity

> It is through speech activity [*rečevaja dejatel'nost', Sprechtätigkeit*] that the influence of social factors on language is realized, and it is only through its mediation that these are reflected in language as such. (A. A. Leont'ev 1969: 21)

The classical approach to language and language learning—which is even accepted by those who (only apparently) subscribe to dialogical theories of language—takes speech as a form of activity designed to express some ideational content supposed to be behind the speech. A pragmatically oriented cultural-historical activity theoretic approach takes a different stance in that it considers speech activity to be an integral part of the productive activity (i.e., *dejatel'nost', Tätigkeit*) in which the individuals are involved. In this way, speaking is viewed by considering all subjective and objective factors that determine it in the totality of connections that the current activity system constitutes. In this way, "the real process of communication is not the production of an equivalence between speaking and the outer world" (A. A. Leont'ev 1969: 11). Instead, the real process is "the production of an equivalence between the concrete situation, on which the activity is based, that is, the content, motive, and form of the activity on the one side and between the structure and the elements of the verbal expression on the other" (ibid: 11). As a consequence, every act of speech always already constitutes the correspondence of two activities, or rather, the integration of speech activity (*rečevaja dejatel'nost'*) into the larger system of society-sustaining productive activity. The two aspects, the encompassing the-life-of-society-sustaining activity and speech/ communicative activity mutually constitute each other so that we can say that activity produces speech—and, therefore, language—just as speech produces activity. This speech activity does not exist as a phenomenon in, of, and for itself. There is a system of speech acts that belong to and contribute to realizing a specific activity. Nevertheless, A. A. Leont'ev suggests that it is useful to employ the term speech activity because it forces us to think about the irreducible part–whole relation of speech and societal activity.

If we now consider the three foregoing examples (scientists in the laboratory, fourth-grade students doing a math task, twelfth-grade students accusing each other of racism), we are led to ask the question about the nature of the activity that is realized and its connections to other productive activities. In the first instance, we find ourselves in a biological research laboratory. The scientists and their laboratory are integral part of research activity the motive of which is to con-

tribute to the knowledge available to society—apart from the teaching functions that the professor also has. Thus, this research activity is linked to the entire system of tertiary education with its double focus on reproducing the field of science and producing knowledge that society can use. What we hear in the laboratory—the speech and with it the language that is realized—has to be understood as an irreducible part of research activity, itself integral part of the university as institution with its role in the production and transformation of a part of society and its cultural-historically specific (scientific) knowledge.

In considering the second example, we must also identify the appropriate frame of analysis, the activity of which the lesson fragment is an integral part. Many STEM scholars—in part because of the conflation of *dejatel'nost'/Tätigkeit* and *aktivnost'/Aktivität* that the English term activity produces—would suggest that we observe "mathematics activity" that occurs in a fourth-grade mathematics classroom. However, to find the appropriate level of analysis, activity, we may better ask: "What is being produced here that contributes to meeting a societal need?" In other words, we may ask: "What is the product that subsequently is taken up in other activity systems?"[6] We then realize that the event is part of a larger system that produces grades and grade reports that constitute the keys to subsequent opportunities. For some, and as a function of the grades, these will be tertiary institutions of different reputation, but for others these will be labor as a tradesperson, and for some—those who drop out or have grades that are too low to even make it into trade school—these will be menial labor, unemployment, or welfare. Thus, when we analyze the speech activity involving Jeanne and Mario, we have to keep in mind and take into account that they are doing schooling activity rather than mathematics *in the way* mathematicians do it.

The third example exemplifies that we always need to take into account the interconnectedness of activities and that a clear separation is not possible, though depending on the particular case, the relationship between one societal activity and all the others may be invisible or negligible. Once we take this stand, we will no longer think about the students as switching between first and third space, or as crossing cultural boundaries—which are some of the current ways of theorizing such events. Ralf, Miles, and Ken do not consider themselves as crossing boundaries and traversing borders. They participate in the life of society generally, though here they are part of the schooling activity. Nevertheless, they are also talking about an issue that is the topic in other circumstances of their everyday lives: when they are in the dorm, in the chapel, or even when they are out of school where they are and have been friends long after they have left school and university. Schooling is an integral part of their lives so that the school-specific discourse, here the language of physics, only is a small part of their daily speech activity more generally.

Cultural-historical activity theory takes an integrative perspective on personality (A. N. Leont'ev 1983). This is so because it considers personality to be the result of the totality of societal relations that an individual entertains and has entertained. The relations, however, are a function of the different societal activities. In

[6] Not all activity is productive. Activity theory includes, besides production, those activities concerned with exchange, distribution, and consumption (Marx/Engels 1962). Thus, we might alternatively ask: "What is the object that is consumed [exchanged, distributed]?"

participating in these activities, the individual contributes to realizing its collective object/motives—willingly or forcedly. Personality is then understood as the ensemble or totality of object/motives, that is, personality is understood in terms of the societal functions of the activities in which we are part: we are teachers, students, scientists, researchers. However, for each individual, the relations between the different object/motives are organized into a different hierarchy and with different strengths (importance) of the connections between the object/motives. This latter part makes personality particular to each individual even though the constitutive parts that constitute the system—i.e., the object/motives—are entirely societal.

In all three fragments from the everyday life of the respective members to the setting, there is more to speech than its content. It is in and through talking that their societal relation comes about, exists, and is sustained and transformed. In the first instance, the relation is one between members of a scientific research group in the process of collecting the data for a paper that they have already envisioned. Their talk is not primarily *about* something but is integral to the attempt to get the computer monitor into the same state that it had been in on the night before. It is in and through the talk that the chief scientist and his research associate maintain their relation, here collecting data in a collaborative fashion—though there is also a hierarchical relation between them, because Craig is Theo's employer.

In the second instance, the talk involves Mario and his teacher Jeannie. Their talk, too, is not so much *about* something as it is geared to getting Mario back on track in his task following his statement that he does not understand and that "*this* is dumb." They have to talk to get the task, which realizes the schooling activity, back on track, to move it ahead. As we see, the talk itself is moving ahead, the language is changing as the schooling activity moves on without actually moving on: the student and his teacher are stuck. But this stuckness becomes apparent only in the attempt of moving on, as a part of moving on. Speaking is required to get unstuck, without assurance, however, that speaking actually gets the situation unstuck rather than getting them bogged down further in difficulties. Here the interrelation between general activity (*dejatel'nost'*) and speech activity (*rečevaja dejatel'nost'*) is quite apparent. The language used in speech changes as it apparently does not improve upon the situation. But this attempt in moving the activity along by changing language is itself integral part of the activity. That is, talk is producing activity; and activity is producing talk. The two aspects are so intertwined that we cannot take them apart.

Simultaneously, the two participants realize a societal relation (*obščestvennoe otnošenie*). It is a particular hierarchical relation within the institution (activity system) of schooling, attributing different roles in the division of labor from which issue the grades and diploma that schooling produces. The sequentially ordered turn taking, whereby one individual asks questions to which she apparently already has the answer against which the response is judged, is typical for school situations. It is in this achievement of a particular form of turn taking that the societal relation characteristic of schooling is reproduced. Each member to the setting does a particular part for this societal relation to be exhibited; and it is precisely in this practical realization of the relation that society comes to life. Speech

activity is an integral part of the realization of practical activity, both in form—the particularly institutionally ordered turn taking sequence (teacher–student–teacher), with its particular distribution of grammatical order (question–[tentative] reply–evaluation)—and content. This "language reflects societal praxis of humanity—if we grasp it not as a formalized system but as a phenomenon in the process of verbal thinking" (A. A. Leont'ev 1969: 26). That this is so is immediately evident, for schooling is a societal activity, fulfilling the need of society for guarding children, producing indicators of their differential aptitudes for subsequent studies or jobs, and, thereby, generally reproducing class society. Societal activity goes with the societal nature of speech activity, which stands with the overall activity in a dialectical/dialogical relation.

As readers can notice, throughout this explanation of practical activity and the speech activity that sustains it and is subordinate to it, there is no need for otherworldly «meaning» or «mental representation». Everything that matters is in the here-and-now of the situation in which the subjects of activity find themselves. But we can save the concept of «meaning» if we think about it in a singular plural way: as the ensemble of ways of talking about «the same thing». I develop this approach in the following two chapters.