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Work, Primary Experiences, and Accounts

In my work as a researcher who reads research and as research methodologist who advises others on issues of research method, I can identify a frequent confusion between accounts of experiences and the experiences themselves.[1] What we can say is always less than what we have lived. For example, in chapter 2, I deal with methods of investigating perceptual experiences. It should be evident that there is a big difference between saying 'I see a cube' and the work of the living-lived body (the pathic flesh) that produces for me what I report to be a cube. There are worlds apart between feeling pain and the thought (report) that one is in pain. The former is something present (i.e., being, verb) whereas the latter is a representation (being, noun). The two are the same only from and within a metaphysical perspective. One experience that I repeatedly have had with doctors is telling them about my fatigue. They cannot say when or why I am in pain or fatigued and yet I experience, but have a hard time communicating, the telltale 'signs' of pain and fatigue when they announce themselves (see chapter 9). There is a difference between the plenitude of our sensing and feeling (presence) and the communicative potential of a language that makes present again something that itself is absent. My family physician ambiguously says that I 'might' have 'chronic fatigue slash fibromyalgia'. My rheumatologist tells me to the face 'You have nothing!' even though I am sitting before him with great pain in my arm and hip joints. It is apparent that he lacks what it takes to be sympathetic and empathetic. He has not had this experience where a pain is inaccessible to another person. He might even think that the problem is not pain after all but a psychosomatic imagination of pain. In chapter 8, we already are confronted with the gap between what the English language awkwardly renders as Being (*Sein, être*) and as beings (*Seiendes, êtant*). The living work underlying our structured world is part of the former, whereas the content of the language belongs to the latter (though the language itself also exists, and therefore in the form of being [verb]).[2] Investigations of *accounts* of experience lead us to the

[1] As noted in chapter 9 (footnote 9, p. 35), there is a difference between *method*, a descriptive term for what has done to realize a research project, and *methodology*, the science of method.

[2] Using language, however, such as in speaking, again is a process of the kind that interest us here.

structure of beings, for example, language (its metaphors, genres, concepts) whereas the living and lived work takes us to the structures underlying perceptual experience.

Confusing Experiences and Accounts Thereof

The confusion between living-lived work and accounts thereof leads to problematic situations in those cases where researchers attempt to understand what an experience is like without ever reflecting about the difference between what we can say an experience to be like and what it feels – any making present again inherently and unavoidable constitutes an *abstraction*. The recipe *is not the actual work of cooking*. When I refer to first-person methods, then I mean conducting research in which we produce experiences in our own bodies so that we have more available than the description alone. We want to have the pathic of the pathic experience so that we may become truly *em*pathic and *sym*pathetic. We want to access that which is pre-noetic, that is, that which comes and is experienced *before* thought sets in. Let me begin by describing the road that I would not want to go, one that I do not classify among lived experiences but under descriptions (accounts) of experiences. To anticipate my hypothesis: analyses of descriptions can only reveal us properties of language. I draw, in exemplary fashion, on the description of methodology and method of one recent study (Henriksson 2008). As the subtitle of the book suggests, the author is interested in 'school failure as *lived* experience' (emphasis added). Early on in the methods chapter, she provides the anecdote of one of her research participants, who, as a young child, did not understand why her mother would have said 'the temperature as fallen' when the temperature had gone from –7 °C to –10 °C. The anecdote describes the child to have asked the teacher, who, together with her classmates, laughed at him. Only a few years prior to the telling the anecdote, the narrator asked a person whom he trusted to answer his childhood question: 'And when *he* explained about temperature and the thermometer I understood! For fifty years I have felt so stupid, a complete failure. They put me in a class for children with special needs' (ibid: 41–42).

After raising a few questions about what the anecdote may be about, the author suggests: 'Whatever feelings the anecdote might evoke, this is still the personal experience of this particular pupil. One needs to take a closer look at the text to transcend the unique and enter into the universal. What themes does a detailed analysis unveil?' (ibid: 42). The author then provides a list of ten themes with concrete quotes from the narrative that she was analyzing, of which I reproduce the first four:

1. *Placing the reason for failure inside him* ('I always found it difficult to understand when my teacher was explaining something. Everything seemed so self-evident and easy for my peers'.)
2. *Individual understanding* ('I did not understand. Ten is more than seven. Why was it that the temperature had fallen?')

3. *Feeling of being ridiculed* ('When I asked the teacher, she made fun of me and the other pupils laughed'.)
4. *Feeling of shame* ('I was so embarrassed'.) (Ibid: 42)

The author concludes: 'It is obvious that some of the themes are more phenomenological, whereas the others are more hermeneutic; it is so difficult to communicate an experience without giving it some kind of interpretation' (ibid: 42). She continues:

> From individual subjective experience it is possible to find universal experiences. From several individual lived-experience descriptions it is possible to distinguish the essential themes from incidental themes: What do lived-experience descriptions have in common? What might be the essential experiences of school failure? How can a couple of subjective experiences be of any importance to people in general? (Ibid: 42–43)

From my perspective, these few quotations provide evidence of some fundamental (logical) contradictions that underlie this approach to investigating lived experience; and they also reveal the path we need to take to understand just what is happening in the author's method and what its practitioners will find.

The author clearly focuses on the text of the anecdote and provides us with themes that denote its structural features. These are therefore themes of the *account* rather than themes of the *incarnate* experience and work that is being accounted for. For example, the author notes as the first theme that the narrative places the reason for failure inside him. But this is nothing universal of *experience* but rather of the language used. In this case, the participant talks about understanding and that he had difficulties with it. Inherently, the English language provides us with two options for the responsibility in understanding when the subjects involve student and teacher. The student has difficulties understanding, making him the subject of the sentence, or the teacher does not explain very well, making the teacher the subject.[3] In a language focusing on teaching – a language in which teaching is conceived of in terms of something like a Nuremberg Funnel – the teacher is *always* at fault. It is not the experience that is analyzed. Rather, the properties of language are revealed. If the language where knowing solely is described in terms of practice, a narrator would never talk about not understanding but about not being able to do something. The language that we have available, therefore, also constitutes the epistemology – it is an ideology through and through (Bakhtine [Volochinov] 1977). I have shown repeatedly that interviews concerning motivation, interest, identity, or conceptions only bring to the fore *collective* ways of talking about these phenomena, the possibilities of which are concretely realized in the interview situation (e.g., Roth 2008; Roth and Hsu 2008). There are very general patterns and narrative forms that are reproduced. Thus, for example, autobiography and biography constitute the same genre, with the same linguistic means. Moreover, it has

[3] In chapter 8, I make reference to a conception of the event, which questions the very nature of the relation between causes and effects, two concepts that are ill-suited to model *emergent* events that are saturated phenomena. The analysis of different forms of events – historical events, births, fatherhood – allow us to deconstruct the cause–effect relation typical of the metaphysical approach (e.g., Marion 2010; Nietzsche 1954).

been recognized that there is a difference between the author and the protagonist in the autobiographical account, where the latter, to be authentic, has to act according to the needs of the plot – otherwise the narrative does not make sense (Bakhtin 1981). That is, what the author of *Living Away from Blessings: School Failure as Lived Experience* reveals are properties and possibilities of the English language to talk about school failure in a reasonable and intelligible manner.

Very early on in my career as a professor of qualitative and quantitative methods, I became aware of the role of language in telling experience and the difference between lived experience and accounts thereof. While I was teaching a course that introduced Masters-level students to research methods, I invited students to talk about phenomena of their interest so that we could develop possible methods for researching them. One student talked about being an adult child of alcoholics. Her peers were very interested; but none provided any indication during the discussion that s/he, too, was an adult child of alcoholics. However, when we met again, about one quarter of the students in the class provided biographies in which they were adult children of alcoholics. That is, even though they had not known this concept before and the language that surrounded it, these individuals began to account for their lives – providing reasons for why they had acted in this or that way – in terms of this newfound biographical genre, even though they could not have had their original experiences under this aspect given that the discourse was not available. If a researcher had done an investigation prior to the beginning of my class on the biographies of these participants, she would have analyzed very different narratives than she would have done following the class. In the latter, themes to the lives of grown-up children of alcoholics would have constituted a dominant part – just as feeling of shame, feeling of being ridiculed, or a focus on individual understanding was dominant in the accounts of school failure. This is not to say that school failure could not be researched from a first-person perspective. Quite the contrary is true. It might be a very important research topic to be investigated by means of a first-person research method. However, few of those who get into teaching, education, and university themselves have actually experienced school failure. There are few colleagues – I cannot think of any one right now – who has repeated a grade, as I have had to do following my first year in fifth grade, because they failed to meet the expectations for the grade.[4] If I am interested in the pathic aspects of school failure, then, to speak from and through my experience, I have to have lived this failure rather than only heard accounts of it.

[4] In part, this failure may have been provoked by the fact that I could not hear but did not know because lip reading had compensated for the loss of my auditory capacities (see chapter 4). I did not know that people addressed me while standing behind me. My teachers thought I was dumb (i.e., stupid) and therefore did not respond (i.e., was dumb). It was not until my mother visited me in the boarding home that she noticed I could not hear. By then, I was down the failing track from which I could not recuperate.

Investigating the Living-Lived Work of Geometrical Proving

In this section, I provide a practical demonstration of how to investigate the relationship between living-lived work of doing something, on the one hand, and the account of this work, on the other hand. Whereas the accounts are available to anyone, the work as living-lived experience is available only to those who actually do what the account describes. Most readers will have had relevant experiences but might not have thought about them as such. For example, think about reading a recipe for cooking some gorgeous food. This recipe is the account of the work required to make the food. You can read it; you can even memorize it for a high school cooking class examination. Does this mean you know how to cook (like a chef)? Of course not! Many a person has tried following a recipe only to notice at the end that what s/he has cooked does not at all resemble what can be seen in the photograph that goes with the recipe. Although you have apparently followed what the recipe says, the food may be burned, tough, coarse, indigestible, disgusting, or unsightly. What has gone wrong?

But when you eat at your friend's place, the same dish turns out to be delectable. Or, with a few years of experience, you may produce a delicious meal based on the same recipe. In this case, one will say that the cook has followed the instruction. In fact, my own research suggests that we ought to see the relationship between recipe and final dish the other way around. Thus, I found that even in the most advanced science laboratories, where a research professor had done fish eye dissections for 30 years, he sometimes realized in the evening that the dissection he had done in the morning was not according to the plan. At the time, he had thought having done one thing, but in the evening, after having worked with the materials from the dissection all day, he revised his account. The recipe describes what we has done only after the fact, when our actions have yielded what we had intended to produce; or, rather, in this professor's case, the recipe did not account for what he has done. In the first instance, when you did not succeed in making what you wanted to make, the recipe does not constitute an account of your work. But it does constitute an account when you have succeeded. Thus, the question whether you follow or do not follow the recipe can be answered only once you know the outcome rather than while cooking.[5]

Throughout this book, I emphasize the experimental (observational) nature of first-person methods. My intent is to provide for experiences right here in the pages of this book that allow readers to re-live the phenomena described to the extent possible. To bring out the difference between living-lived work (experience) and the account thereof, I invite readers to go through a perhaps surprisingly simple geometrical proof that brings home the message. The proof is that of the sum of the interior angles of a triangle, which, on the Euclidean plane, always add up to

[5] This, therefore, is but another situation in which the normal (metaphysical) order of things comes to be upset: we do not first intend (plan = cause) an action and, thereby, bring about some result (effect). Rather, whether the plan is an appropriate description of the action can be established only after the fact. The effect has to be known prior to being able to attribute a cause. On this point see Nietzsche, 1954.

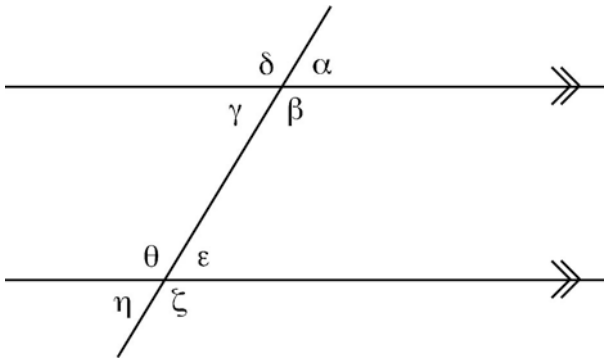

Fig. 12.1 The angles produced when a line crosses two parallel (») lines.

180°.[6] I begin by providing the proof account and then investigate, exhibiting the first-person method at work, the work of seeing things mathematically, for example, straight lines, intersections, and angles.

The Proof Account

The proof that the internal angle sum of a triangle is 180° involves a drawing (Fig. 12.1) and the following. In a first step, we note the relationships between angles that are produced when a line crosses two parallel lines (marked by the sign "»"). These angles are labeled, in the tradition of geometry, by means of Greek letters beginning with α and in clockwise direction for each of the two intersections.

a. The pairs (α,ε), (β,ζ), (η,γ), and (θ,δ) are known as corresponding angles; corresponding angles are equal (i.e., $\alpha = \varepsilon$, etc.) because the two horizontal lines are parallel.
b. The pairs (α,γ), (β,δ), (ε,η), and (ζ,θ) are known as vertically opposite angles; vertically opposite angles are equal (i.e., $\alpha = \gamma$, $\beta = \delta$, etc.).
c. The pairs (ε,γ) and (θ,β) are alternate angles. Alternate angles are equal (i.e., $\varepsilon = \gamma$). This is so because of (a) $\varepsilon = \alpha$ and (b) $\alpha = \gamma$, we can re-write this as $\varepsilon = \alpha = \gamma$ or, for short, $\varepsilon = \gamma$. In a shortened version of this third statement, we might have simply stated $\varepsilon = \gamma$ and referred to the first two statements: because of (a) and (b)

Readers unfamiliar with geometry might find already that seeing these relations itself requires a particular form of perception. Or they might ask themselves, 'Why should opposite angles be equal?' I return to the living/lived work of mathematical seeing below. For the moment, we return to the proof account.

[6] The development of this account was provided as part of a chapter on mathematical cognition (Roth 2012).

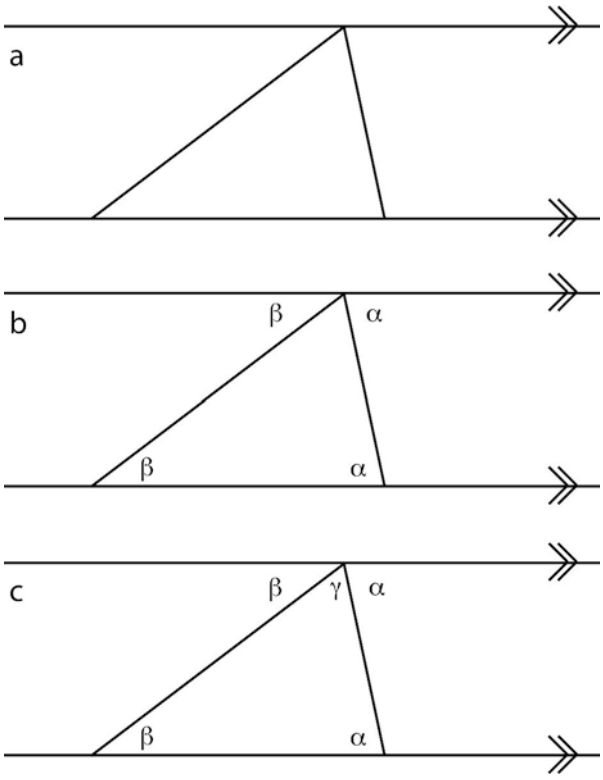

Fig. 12.2 Steps in and part of the account for the proof that the interior angle sum of a triangle is 180°.

With the identities listed in (a) through (c) in place, we now prove that in the Euclidean plane, the angle sum in a triangle is 180° – if the total angle around a point is defined as 360°. This proof includes the following steps together with three diagrams (Fig. 12.2a–c).

a. Any triangle can be drawn such that the base lies on one of two parallel lines and the opposing vertex on the other (Fig. 12.2a). (If you started with a triangle, extend its base on either side and then construct a parallel line through the opposing vertex.)
b. We know that alternate angles are equal, as marked in the second diagram (Fig. 12.2b). (Each of the two sides of the triangle can be viewed as a line of the type seen in Fig. 12.1)
c. Hence, because of the configuration of lines at the upper parallel, α, β, and γ add up to 180°, that is, $\alpha + \beta + \gamma = 180°$. (Think of a line cutting the plane in half, which means, each have covers 180° so that the total angle on both side of the line add up to 360°.) Therefore three angles in a triangle add up to 180°.

The preceding steps and figures do not constitute the entirety of the proof; rather, they constitute what we know to be the *proof account*. If you follow what I

describe as having done myself, you will *see* that 'α, β, and γ add up to 180°, that is, $\alpha + \beta + \gamma = 180°$'. You can literally see it as these angles are aligned on the upper parallel; and, because these three angles are those within the triangle, you can see – or perhaps better: understand – that the angle sum is 180°. Now these are the parts that one might find in a textbook on geometry, on a website, or, in the case of new mathematical discoveries, in relevant journals. But this does not mean that 'you', the reader, have *actually* seen, with your own eyes, and simultaneously *comprehended* the proof. You may have seen the proof account but never actually lived it through so that every step becomes intelligible. Again, a comparison with the recipe may help (it functions as our analogical case here). Reading a recipe does not imply that you know the recipe, that is, that you know what it means to act such that after the fact the recipe *is* an account of what you have done. This latter part comes from the work of actually living the proof. The former part is a description, a recipe for doing the proof. It allows us to re-do the proof over and over again, which certainly has been done so since some time in antiquity, when the proof was done for a first time (Husserl 1939). For example, the reviewers of an article submitted to a mathematics journal take the proof it contains as instructions for doing the proof *again*, checking whether there are 'no holes' in the proof procedure. This *cannot* be seen by gazing at the proof account. Whether there is a hole in the proof procedure actually needs to be discovered in the actions of doing the proof. When the reviewers get the same result after *working through it*, their own living-lived (subjective) work has reproduced the *same* objective account. The proof becomes a fact. In written form, this account suffices to guarantee that the proof procedure can be handed down – initially, to share it with others in the prover's community. In other words, the proof is objective because different subjectivities yield the same results.

Ordinarily, newcomers to a discipline learn these practices in face-to-face work with others who monitor and give feedback to correct actions; but the written accounts are such that they allow others to re-discover the proof in their own *praxis*. That is, we find the relevance of an instruction in our own doing as soon as this doing has yielded the correct result. I use the term praxis to denote the real situation where the living/lived work occurs; it generally is not characterized by thematization and 'metacognition'. *Practice*, on the other hand, refers to the patterned action and therefore denotes something apparent to a theoretical gaze rather than to the regard of the practitioner. That is, as initially arbitrary and tentative actions are marked as subject to correction, the student tries again. Once such actions receive approval, then the immanent generating mechanism, the self-affected movement, can now or after some trials reproduce the action intentionally. Such 'approval' could come, for example, from our own satisfaction with the results of our preceding actions; or it could come from some external source, a mentor, who guides us, or a teacher. But in each case, what I do truly and in all senses of the word constitutes a rediscovery of the proof in and through my actions. This possibility for the rediscovery of the proof in fact constitutes the objective and tradable nature of geometry as objective science. Thus, 'the important function of *writing* is to enable the *continual objectivity* of ideal sense entities in the curious form of virtuality'

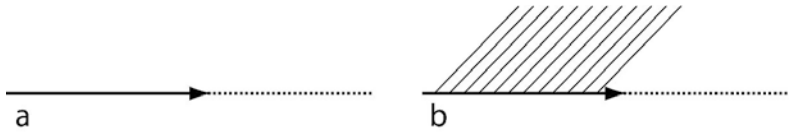

Fig. 12.3 In the dynamic of drawing a line, the plane becomes bisected, here denoted by a hatched and an unhatched part.

(Husserl 1939: 212).[7] The ideal (subjective) objects exist *virtually* in the world in written, objective form, and they therefore can be *actually* produced at any time. The lived praxis (labor) within this written account *counts* as the proof. However, it is not actually contained in the written account. *It is precisely this lived work that we are interested in here and in ways of capturing it*. We already see some of what is involved in the inquiry concerning the question of what makes a cube a cube (chapter 2). To bring this proof to life we actually need to do it in and as of living/lived labor for which the written record has to provide sufficient resources.

The Living-Lived Work of Mathematical Seeing in Proving

Here we are interested in a method for producing the actual experience of the living/lived work within which the corresponding accounts constitute the resources that allow us to count what is happening as a proof. In the first part of this chapter, I critique the approach chosen in hermeneutic phenomenology, at least as interpreted by many educational researchers. I suggest that it focuses on *accounts* of experience rather than on the experience itself. It extracts structures from these accounts. The equivalent in the present situation would be to take what a person says or writes as equivalent to the experience of proving. That is, if we analyze what I provide as an account of the proof of the sum of the internal angles, then it will be immediately evident that we obtain as themes or patterns precisely what *culture* makes possible – in and through language and other communicative means – rather than what is individually and singularly lived. The same is true for investigations of the 'feelings' I might have during the proof process. If I provide an account of my feelings – the difficulties, frustrations, and elation that comes with successful completion – after having completed the proof, I am still analyzing the account. That is, the themes I can come up with concern the ways in which we can talk about the proof procedure or the feelings that we have had in the process. The first-person method directly accesses the experience when the researchers do what they are interested in studying. So what is the living-lived work of proving?

Part of the kind of work involved is articulated in chapter 2, that is, the lived work of seeing something. In the present instance, for example, this living/lived work includes the re/cognition that pairs of corresponding, opposite, or alternate angles are equal. That these pairs of angles are equal presupposes the seeing of

[7] We also know this from scientific research. Something is a new discovery rather than an artifact when others, using the same method (i.e., recipe) get the same results.

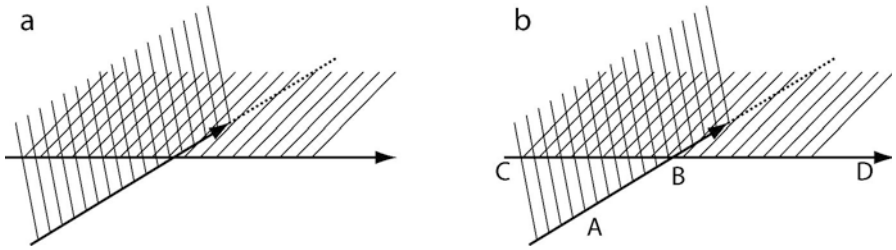

Fig. 12.4 Two intersecting lines produce four sectors.

each angle – where the work of *seeing* is described above. Such *seeing* is related to the living/lived work of drawing multiple lines, each of which bisects the plane (Figure 12.3). This work involves particular movements, integral kinesthetic structures that unfold on their own and in their entirety once triggered. These movements are inscribed in the living-lived body (the flesh) where it constitutes an immanent form of knowing. I do not only draw the line after placing the pencil, I also feel (chapter 3), even if ever so vaguely, the hand moving from left to right. There is a resistance. I change the pen, and notice that the resistance is changing. It differs according to the pen I use – rougher in the case where I see that there is less ink flowing – also requiring me to push harder and put some more pressure onto the pen and paper, which in turn increases the resistance of the pen on the paper. I can sense the ballpoint moving across the paper, in a manner more flowing with one and more jerky in another case. Drawing a line involves more. I see the line as it unfolds under my hand and splits the formerly immaculate plane in two. Drawing, splitting the plane, and seeing the plane splitting as I draw all are confounded into one and the same act. In fact, already before I begin, there is an ever so vague sense of what will be happening when I place the pen and move from left to right – the anticipation that is associated with intentional movement, itself due to the self-knowledge of the muscles and nerves that will bring the movement about.

From the perspective of the living-lived work, the writing gesture produces the divisions of our pre-geometrical perceptual experience of left/right, up/down, and so on. Even if the movements initially are arbitrary and random, they constitute traces that mark differences in space, and thereby shape the perceptual experiences that follow. In addition, the work of seeing something even as simple the first line against the white ground involves work: the eyes have to produce the saccadic movements that take them away (see chapter 2) to find the line again upon returning and, thereby, constitute the reality of the line.

When, after the completion of the first line (involving a complete bisection of the plane), a second line is added, it, too, bisects the plane. Already after my hand begins to move the pen, an ephemeral shadow falls across part of the paper, sensing an angle to emerge. In fact, once the movement is completed, four angles and sectors have thereby been produced, which appear in three different hatchings: not-hatched, once-hatched, and twice-hatched areas (Fig. 12.4a). It is the latter that previously has appeared as the ephemeral grey.

I could have also drawn the second line in the reverse and produced the same account: beginning somewhere from the top and right and moving to my lower left.

For this reason, the angles enclosing the single-hatched areas are the same. What is in the first drawing the angle forming first to the left and then to the right will be, upon beginning the diagram from the other side, again first to the left and then to the right. In this very act of drawing, we also produce an order that goes with the naming of locations (Fig. 12.4b). In this way, the unfolding from the drawing the AB line with respect to CD forms angles ABC and ABD, which we may also name, following the tradition, by the Greek letters α and β (as well as the equivalent angles γ and δ) (Fig. 12.5). Here, the order in the actual making constitutes a conceptual order: 'The temporally placed label of an angle or its apparently disengaged placement in a finished figure exhibits this seen relationship as a proof-specific relevance' (Livingston 1987: 96). The conceptual order is *in* and *arises from* the movement rather than from the constructive mind, if there indeed should exist something of that kind. Mind and sensorimotor schema are *post-kinetic*, as are all accounts of mathematical experience.

The relationships between the lines, angles, bisectors, and sectors have to be seen. That is, in a very strong sense that must be emphasized, seeing involves work (see chapter 2). To be able to do any proving at all, we have to *see* that $\alpha = \gamma$ and that $\beta = \delta$. This seeing, as experienced and described in chapter 2, is based on the movements of the eyes, movements that we are not in conscious control of. But these movements reproduce themselves to allow us to see the cube over and over again, or, in the present instance, to see the equivalence of alternate angles once we have seen it for a first, second, or third time. Not surprisingly, phenomenological philosophers have recognized the fundamental passivity that is associated with a *first* cognition that such seeing involves. Any first formation of sense has two passive moments: the first existing in the first cognition and the second in the fact of the retention of this first cognition (Husserl 1939). Thus, 'the passivity of the initially darkly awakened (insight) and the eventually increasing clarity of that which appears is accompanied by the possibility of a change in the activity of a *remembrance*, in which the past experience is lived again actively and quasi anew' (ibid: 211). The memory is awakened passively but can be transformed back into corresponding activity when I live the experience over again. The relationship is cognized again: it is re-cognized or *re*cognized. It may therefore be maintained throughout the proof procedure, which leaves behind, as its end result, the sequence of the diagrams involved (Fig. 12.1, 12.2). In making the drawings (Fig. 12.2), I do not specify a particular angle to be produced. I could do the same using a differently slanted line that crosses the two parallels. Any work that produces two non-parallel lines suffices to get us to this point. This fact produces the generality of the proof procedure. Because *any* work of this type gets us to the same results, the same relations between the labeled angle exists making the proof procedure valid for *any* triangle that we may draw on the Euclidean plane. That is, the generalizability derives from the nature of this work itself.

All of this may have appeared to be self-evident. Yet if we do not understand why the self-evident is self-evident – because to the animal that we once were it is not – and how what is self-evident has become such, we do not understand a thing. I can decide to draw a line because my hands, arm, and finger know what to do to produce one. There could not be any intention of drawing a line (see chapter 6) unless my flesh did not already know what it is to draw a line. Much as my hand

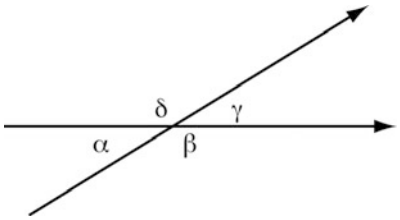

Fig. 12.5 The placement of the labels α, β, γ, and δ is apparently disengaged from the temporal practice of drawing the figure.

remembers a phone number that my conscious mind has already forgotten (chapter 6), my hands and fingers know to draw a line when such is required.

This immemorial, subjective memory is important in the constitution of geometry as an *objective* science in and through the subjective, living-lived, sensuous work of the geometer. A sense-forming act that came about spontaneously can be actively/passively remembered, and therefore reproduced not only by the original individual but by any other individual as well. It is in the reproduction of the living-lived *work* that the evidence of the identity between original and subsequent act arises: 'That which now is originally reconstituted is the same as what was evident before' (Husserl 1939: 211). That is, together with the original sense formation comes the possibility of an arbitrary number of repetitions that are identical in the chain of repetitions. As a consequence, the very subjective, living-lived work of doing and seeing geometry that allows me to recognize relationships again also make for the societal nature of geometry and its historicity as objective science.

Interestingly, the very generality of the proof derives from the way in which the sensuous work generally and the sensuous work of seeing specifically unfolds. For example, in the drawing of a line that crosses two parallel lines and labeling alternate angles using the same letter, the proof makes available that any such line could have been drawn, which in fact occurs when the second line between the two parallels is drawn such as to form a triangle. The very possibility to have one line between parallel lines with alternate angles enables all other lines. The relations between the angles in configurations of parallel lines crossed by a third thereby imply the angle sum of the triangle to be 180°. The way in which living-lived work draws parallel lines and sees the equivalent angles that follow from (the idea of) parallelism simultaneously constitute the angle sum to be 180°. That this is so can be discovered over and over again because (necessarily written) proof-accounts describe, like a recipe, their own work. That is, it is precisely 'in this particularistic way, the generality of our proof-account's description was evidenced in and as the lived, seen, material details of the proof' (Livingston 1987: 108). The very nature of geometry as objectivity science arises from the demonstrability and visibility of its procedures in the living-lived (subjective) work of proving, including the living-lived work of mathematical seeing. Anyone may reproduce the sensuous work anywhere. In sum, therefore, we realize that the 'generality of our proof both is in and not in the proof-account; it is in that proof-account through the pairing of that account with its lived-work' (ibid: 108).

In this first description of some of the work involved in a geometrical proof, we can see an outline of how the living-lived work of producing, seeing, and labeling the angles is actually accomplished. (Recall, it is not in my words that this work is accomplished, it is in the drawing and seeing of lines and angles that the work unfolds and is felt.) This drawing, seeing, and labeling is available to those present; this drawing, seeing, and labeling makes the work objectively available to those present. But this sensuous work does not (and cannot) appear in the proof account proper, where the lines and labels appear disengaged from the actual movements of drawing, seeing, and labeling. The *work* as something that lives is invisible in the same way as life as a whole is invisible, even when someone else does watch me while doing the proof. The purpose of the written or verbal account is to make the work independent of my body, yours, in fact, independent of the body of any potential individual reproducing geometry. The account is an *abstraction*. Returning to the critique that opens this chapter: the stories that the author of *Living Away from Blessings* collected to understand school failures are *abstractions*, they do not represent the actual experience of failure but only generalized and culturally intelligible depictions of school failure. As a result, the themes the author identifies are characteristic of the language rather than of the sensuous (living-lived) experiences people have.

All movements involved in drawing, seeing, or labeling involve our living/lived, sensuous body in the manner described in the first section above for the eyes' work that makes a cube from a set of lines. Seeing an angle involves fewer lines, but nevertheless requires the movement of the eye that makes the lines figure against ground, puts into relation the two unfolding lines, the half planes, and the seeing of the intersecting planes against the background (generally white). Even imagining an angle or a line in our minds or recognizing someone else drawing an angle or a line *requires* the activation of the same immanent movements in us that operate when we actually see or draw a line. This fact has been recognized over 200 years ago through phenomenological analysis (Maine de Biran 1841)[8] and has recently been substantiated by neuroscientific studies on the function of mirror neurons. The account, as we might find in textbooks, is disengaged from this sensuous work, but it may serve as a resource on the part of the learner, as an instruction for reliving the sensuous work of proving in and through his/her own living praxis of drawing, seeing, and labeling. The relation between accounts and the lived work can be articulated in this way: In textbooks the actual production of the primal geometrical idealities is surreptitiously substituted by means of drawn figures that render concepts visual-sensibly intuitable. It is up to the students to find in their own subjective sensuous work the practical relevance of the instruction, which in the present example would be the proof-specific relevance of the lines, markings, naming, and so forth.

[8] 'To imagine or remember, the organ of thought has to take again a form, a modification similar to that it had during the perception itself' (Maine de Biran 1841: 58).

Of Perceptual Work and Accounts of Perception

In a text on the formal structures of practical action, Garfinkel and Sacks (1986) propose a way of theorizing the relation between accounts of structured practical actions and the generally invisible work that brings these structures about (Fig. 12.6). Thus, the expression 'doing [proving the sum of the internal angles of a triangle is 180°]' consists of two parts. The text between brackets '[]' topicalizes a particular practice that social scientists and educational researchers might be interested in; the text is a gloss of what a researcher or lay participant might say that is happening. In other words, the text can be understood as that which people tell you what they are doing, whereas the doing itself, the work, is that which needs to be accounted for in, but is different from, words and other forms of accounts. For example, observing a student, a teacher might explain to the researcher visiting the classroom that the former is 'proving the sum of the internal angles of a triangle is 180°'. This text is the verbal account for what is currently happening. Similarly, if asked by the researcher what she has been doing, the student might gloss, 'I was proving that the sum of the internal angles of a triangle is 180°'. When the teacher asks a student on an exam to prove that the sum of the interior angles is 180°, then we might find something on her sheet that resembles the proof account in the preceding section.

Almost all research in the social sciences and education is of this kind. Ethnomethodology distinguishes itself from that research, to which it refers as *formal analysis*. Research methods are provided in articles to articulate how the researchers arrived at identifying the structures that appear between the gloss marks (i.e., between '[' and ']'). But formal analysis does not capture the first part of the expression: it misses the 'doing', that is, the sensuous work that actually produces something that is described by the account or the account itself. This moment of the expression allows us to ask the research question, paraphrasing Garfinkel and Sacks: 'What is the work for which "proving the sum of the internal angles of a triangle is 180°" is that work's accountable text?' or 'What is the work for which "proving the sum of the internal angles of a triangle is 180°" is that work's proper gloss?' (Fig. 12.6b). Similarly, we may ask, 'What is the work for which "seeing an angle" is that work's accountable text (proper gloss)'?

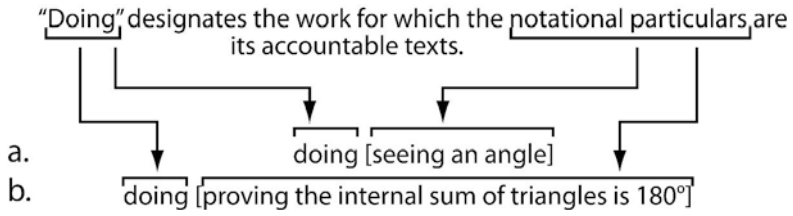

Fig. 12.6 There is a difference between an account of experience and the actual work that produces the experience described. a. In chapter 2, the methods of investigating the work that produces simple perceptual experiences are described: the eye movements differ from the angle or cube that I see. b. More complex phenomena, too, require work to be produced. The description of this work and the lived work producing it differ.

In contrast to constructive formal analysis, we are interested here in specifying the sensuous work by means of which the structures are produced that are accounted for and glossed by the bracketed texts. This work is accessible to us only in and through our bodies. We cannot account for the sensuous work unless we actually access it, which, inherently, means that we have to live it. In other words, the question our first-person method pursues is that in the living-lived and therefore sensuous work, for example, of proving that the internal sum of a triangle (on the Euclidean plane) is 180°.

There are some decided advantages that come with investigating the sensuous work and to produce evidence for its organization. Once we know this organization, we will be able to predict the kinds of results people produce in the same manner as we can predict what kind of entities people will see when looking at the diagram known as the Maltese cross or the Necker cube. In a very strong sense, therefore, once people have seen the Maltese cross or Necker cube, then these drawings are *accounts* of the *work* their eyes have done! However, from knowing the accounts, we cannot infer the nature of the lived work. We do not know what the eyes do when we look at the cross or cube. But once we know the work of seeing, we know what the eyes will do when confronted with drawings such as the cross or cube. From a statement that a person sees a cube while gazing at the Necker cube, we do not know anything about this work that actually produces the perception. From seeing the written work of a student who has produced a proof for the sum of the internal angles of a triangle, we cannot infer anything about the sensuous work that has gone into producing the written work. But the reverse is absolutely the case. Once we know the structures of the sensuous work, we also know what it is that it has produced. For this reason, phenomenological and ethnomethodological accounts of mathematics are related to formal analyses – whether quantitative or qualitative (e.g., phenomenography) – in *asymmetrically alternate ways* (Garfinkel 1996). This is not to say that ethnomethodology disputes the accounts provided by formal analysis; those achievements can be demonstrated and are demonstrated in and as of the *outcomes* of the sensuous work of doing mathematics (or anything else). This asymmetry is radical and incommensurable, but nevertheless obtains to related aspects of mathematics. Our first-person methods – as ethnomethodology or classical phenomenology – are not in the business of 'interpreting' signs that people produce. Rather, we might say that the fundamental phenomenon of a first-person method and 'its standing technical preoccupation in its studies is to find, collect, specify, and make instructably observable the endogenous production and natural accountability of immoral familiar society's most ordinary organizational things in the world, *and to provide for them both and simultaneously as objects and procedurally, as alternate methodologies*' (Garfinkel 1996: 6). The two examples I use here constitute such materials that allow readers, in and through producing the work specified, to experience the sensuous, living/lived, and worksite-specific (inherent lived) praxis of *doing* and *seeing* mathematically.

Coda

Plato uses a story about people sitting in a cave and seeing their shadows on the wall. The shadows are something like evidence that there is a sun, which only one of them is allowed to discover on a trip to the entrance of the cave. While writing the preceding sections, I have been thinking about this story again as a metaphor for the relation between the first-person approach, as I articulate it here, and the other methods in the tradition of hermeneutic phenomenology. The stories that researchers collect, for example, about school failure, are like the shadows on the cave walls in Plato's analogy. Investigating them may be an interesting pursuit in their own right, to find out about the structure of the shadows, but they give access neither to the bodies that cast the shadows nor to the sun that is the cause of the shadows. That is, when we ask people about some experience, we do not have access to the sensuous experience itself. There is some of it, because the descriptions used are based on and related to experiences. But, in the way the shadows provide evidence for the sun and the manner it shines onto the bodies, the stories people tell are indicative of the language they have and are part of the ways in which we tell such stories. Moreover, there are explicit constraints what such stories have to look like, so it is not up to the narrator to make up any text. Rather, narrators make up texts that are inherently intelligible because they have to express possibilities present in and enabled by the culture. In a strange way, researchers working with such other methods do not see the animal (sensuous experience) because of all the foliage (language). When they actually do get to anything resembling an index to the things we feel, then it is because they draw on their own related sensuous experiences.

I am equally suspicious of sports journalists who talk about tennis without ever having played tennis as I am about a celibate priest talking about making love or about a professor talking about teaching secondary mathematics courses without ever having taught secondary mathematics. What all of them may master is a discourse. It is a mastery of symbols, literally therefore symbolic mastery, rather than a real mastery. There is nothing wrong without the former, as we need, for example, physicists who can calculate the trajectory of a football (rocket) in the earth's atmosphere. But in the context of football, this symbolic knowledge is of very little use, and the practical mastery is to be preferred. In the same way, we may be interested in the structures underlying the way in which we tell stories, in accounts of work practice, rather than in the practice itself. This is especially so because practitioners may be as little able to provide a good account of what they do than a good onlooker studying the practice from a third-person perspective (Bourdieu 1980). But the first-person approach combines the two orientations: a rigorous description of the organization of sensuous work such that it can be shared with others because they can live this work in and with their own bodies because these are of the same kind as our own.

Throughout the description of the first-person approach in this chapter, we see variation involved. For example, I note that we can change the angle of the line crossing the two parallel lines (Fig. 12.1). We get the same result: the same relations between corresponding, vertically opposite, and alternate angles. That is,

these three relations are truly independent of the way in which the third line is drawn – unless it were to be drawn parallel to the other two lines, in which case it would not cross or only cross at an infinitely distant point. Similarly, we can do the proof of the internal angle with *any* triangle, and arrive at the same result. This means that the different sensuous experiences all lead to the same result even though parts of the account differ (e.g., the drawings) and even though the sensuous work involved in drawing the first is different from the drawing some second triangle. I also point out that there is sensuous work involved even with the simplest aspects, like drawing a line or seeing a line (which, following chapter 2, involves the saccadic movement along the line that makes it stand out against a ground) and the manner in which it bisects the plane. Seeing half of the plane is the other part of seeing the line (i.e., the figure), even though it may not have been salient as such. Seeing a half plane and seeing the line are alternate ways of describing the same phenomenon. They are two different manifestations of the same phenomenon, where the half plane now is stabilized against the line. The constitute one dehiscent and diastatic phenomenon.