

Single Case Method in Psychology: How to Improve as a Possible Methodology in Quantitative Research

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Abstract Awareness of including Single-Case Method (SCM), as a possible methodology in quantitative research in the field of psychology, has been argued as useful, e.g., by Hurtado-Parrado and López-López (*IPBS: Integrative Psychological & Behavioral Science*, 49:2, 2015). Their article introduces a historical and conceptual analysis of SCMs and proposes changing the, often prevailing, tendency of neglecting SCM as an alternative to Null Hypothesis Significance Testing (NHST). This article contributes by putting a new light on SCM as an equally important methodology in psychology. The intention of the present article is to elaborate this point of view further by discussing one of the most fundamental requirements as well as main characteristics of SCM regarding temporality. In this respect that; “... performance is assessed continuously over time and under different conditions...” Hurtado-Parrado and López-López (*IPBS: Integrative Psychological & Behavioral Science*, 49:2, 2015). Defining principles when it comes to particular units of analysis, both synchronic (spatial) and diachronic (temporal) elements should be incorporated. In this article misunderstandings of the SCM will be adduced, and further the temporality will be described in order to propose how the SCM could have a more severe usability in psychological research. It is further discussed how to implement SCM in psychological methodology. It is suggested that one solution might be to reconsider the notion of time in psychological research to cover more than a variable of control and in this respect also include the notion of time as an irreversible unity *within life*.

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Misunderstandings of Single Case Methods

Hurtado-Parrado and López-López (2015) describe the history of Single Case Methods (SCM), e.g., being related to Behaviour Analysis (BA), as a problematic feature when acknowledging the method in psychological research today. This is though not the only misunderstanding of the SCM in contemporary psychology. In the following other misunderstandings will be described in order to implement a more nuanced understanding of the SCM and eventually implement the temporality in specific, in order to show a new usability of the SCM so to become an acknowledged method in psychological research.

When studying human beings in a psychological framework it seems odd only to study a multiple amount of individuals in order to generalize, even if the individual specifically is the focus of research. The SCM shows to be an excellent tool to understand single cases in scientific research. Acknowledging the benefits in psychology seems more demanding but not at less value. The challenge seems to be related to the understanding of a case-study.

John Gerring (2006, p.17) describes the term ‘case-study’ as “*a definitional morass... Evidently researchers have many different things in mind when they talk about case study research*”. Also Robert Yin (2009, p.14) advocates for single case studies when he defines it as “*an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident*”. These definitions describe case studies as being intended so to provide details and understandings that allows thorough analysis of the complexities of distinct phenomena (Geertz 1973).

Even though these proponents have very fine and distinct descriptions of the case study, there are still misunderstandings of this type of methodology. Flyvbjerg (2006) describes five different misunderstandings, which he corrects in his article:

1. Theoretical knowledge is more valuable than practical knowledge.
2. One cannot generalize from a single case, therefore the single case study cannot contribute to scientific development.
3. The case study is most useful for generating hypotheses, while other methods are more suitable for hypotheses testing and theory building.
4. The case study contains a bias toward verification.
5. It is often difficult to summarize specific case studies.

(ibid. p.1)

As to misunderstanding 1, Flyvbjerg (2001) rejected the claim referring to case-studies inability to make predictions. However, social sciences suggest a predictive theory as less applicable. Same place, it is argued that the framework for human activity is more important than the human activity itself, to understand the phenomenon. But in the description of a concrete, context-specific knowledge the case study makes it possible to understand the limitations of predictions, to thereby, enable the researchers to propose circumstances under which a theory can be applied or not (Smaling 1987). This indicates that the case study research involves a very careful definition of the phenomenon. This binding of the case allows scientists to make predictions that are just adequate in scale of the problem (VanWynsberghe and Khan 2007).

According to misunderstanding 2, case study research does not aim at a universal generalization in the positivistic sense (Donmoyer 1990; Schofield 1990). Lincoln and Guba (2002) believe it is far more convenient and epistemological valuable to abandon the idea of generalization. If generalizations are endorsed, they should be regarded indeterminate, relative and time- and context-aware. Like the predictions generalizations have been recognized as contextual. A number of alternative social scientific concepts for generalization were made. These concepts seem to suggest that a comparison of the case with prior knowledge, experience, other event or theories can provide the possibility of further generalization (Becker 2000; Smaling 1987; VanWynsberghe and Khan 2007; Yin 2009). As Yin (2009) describes it, it is through an analytical generalization possible to find similarities and differences among the phenomena of interest in the case studies. This allows the researcher to expand the scope of the theory that arises from the original case (VanWynsberghe and Khan 2007). The case-study does not generalize to larger populations – instead it generalizes to the theory that underlies the case-study (Ramien 2007). In cultural psychology, which builds on a developmental basis, generalization from a single case is the only way to generalize: “...*generalization is the distancing from the single instance while retaining a connection with it, for the future. Generalization is an ever-new process of signification.*” (Valsiner 2015).

As for misunderstanding 3, small N qualitative research is often at the head of the theoretical development. As quintessential small N research can serve as a source of theory building and testing (Flyvbjerg 2001; Eckstein 2002). In addition a concept of the working hypotheses, has been proposed, to capture the idea that researchers can use experimental hypotheses under special conditions and circumstances, although there is no existence of “true” Generalization (Lincoln and Guba 2002). Case studies are also useful to test the extent of hypotheses, since a single case has the possibility to reject a hypothesis. Hypotheses may thus be generated from both the single but also a number of cases. Discovery of similarities between case studies or the ability to translate between studies shows the extent to which the results of a case study can fit in other cases (Goetz and Lecompte 1984).

Misunderstanding 4 is based on the contention that social scientists are liable to offer subjectively forced explanations. Flyvbjerg (2006) describes the opposite as he explains that case studies involves a careful description of the phenomena from which the evidence is collected, in order to show the likelihood that the researcher is biased against falsification instead of confirmation of prejudices about the case.

As an explanation of misunderstanding 5, it has been stated that case study researchers are often acknowledged for their ability to introduce nuances and complexities to the understanding of a given subject (Collier and Mahoney 1996). This can also be seen as a criticism of the case study as precise details rarely are easy to adapt to the concept of journals and articles. Flyvbjerg (2006) suggests that through a detailed description, the researcher has further opportunity to identify, define or construct the unit of analysis among a number of potential candidates. When the unit is ready the case study reveals its central message (VanWynsberghe and Khan 2007).

To summarize, it seems like much of the critique is associated with misunderstandings as well as a seemingly inability to grasp the particular elements in SCMs. Even though it seems like a sixth misunderstanding needs to be added and elaborated in the discussion. This is the notion of time. Following different aspects of temporality is illuminated with respect to SCMs in relation to psychological research.

Irreversible Time and Repeated Observation

Psychology has been criticized as more concerned with quantitative data than with the dynamic and emergent properties of mind during the study (Toomela 2009, pp. 46–47). Repeating observations of the individual or a group of certain individuals have been associated with BA and the intention of examining changes in conduct. The argument for repeating observations and include both control conditions and at least one of the independent variable conditions, is in order to investigate different possibilities of testing such as predictions about treatment effects (Hurtado-Parrado and López-López 2015). The steady-state strategy which often is related to single-case research with the intention of creating comparable experiments that represents the full effects of each condition, seems to lack the awareness of time as a more than an immediate, tangible instance (ibid.).

Time has been described as providing two possible ways of dealing with research two ways, which are interrelated. The first is the awareness of time as a basic unit often referred to as clock-time. This is the non-lived objective time, which seems to be the dominant understanding in classic single-case research methodologies. However there exists another equally important aspect of time, which is the subjective approach or the *living in time* (Sato and Valsiner 2010, p. 80). Living in time has been described as including social cohesion as well as the irreversibility of time (ibid., pp. 80–84). What is missing in psychology is a methodology that produces adequate knowledge about development and in this sense the notion of qualitative transformation in lived time (ibid., pp. 87–88). Transformation is the notion that makes it possible to understand life within time. It implies change of form like from one form to another as a kind of creative adaptation that goes beyond the current “fit with” or state of survival conditions as well as preparing the individual for possible future demands that it might be facing (ibid., p. 88).

As time is irreversible, comparing different observations in psychological research in relation to behaviour and stating it as a control condition seems redundant since each condition includes elements of previous experiences and might therefore be unique in condition. Thus, the relation between dependent and independent variables seems distinct in psychological research from what is the case in natural sciences. To support this point of view two different research situations are illustrated below. Figure 1, attempts to explain the relationship in natural sciences and Fig. 2, attempts to explain the relationship in psychological research in relation to phenomenological experiencing.

Above in Fig. 1 two conditions are illustrated (1.1 and 1.2) with the only intended difference being the dependent variable (a or b). It indicates that if variable a is used in the condition 1.1 the outcome will be $f(a)$ whereas if instead variable b is used as in condition 1.2 the outcome will be $f(b)$. Time is here understood as an independent variable of both conditions. However in Fig. 2 the relation between the dependent and independent variables becomes more complex by including the irreversibility of time as part of the dependent variable.

The temporal implications associated with the use of SCM in psychological research are difficult to determine. Figure 1 is an attempt to illustrate how natural sciences might use SCM as when testing the relation between the independent variable as the impact of certain medical products over time. Figure 2 attempts in a simplistic way to illustrate

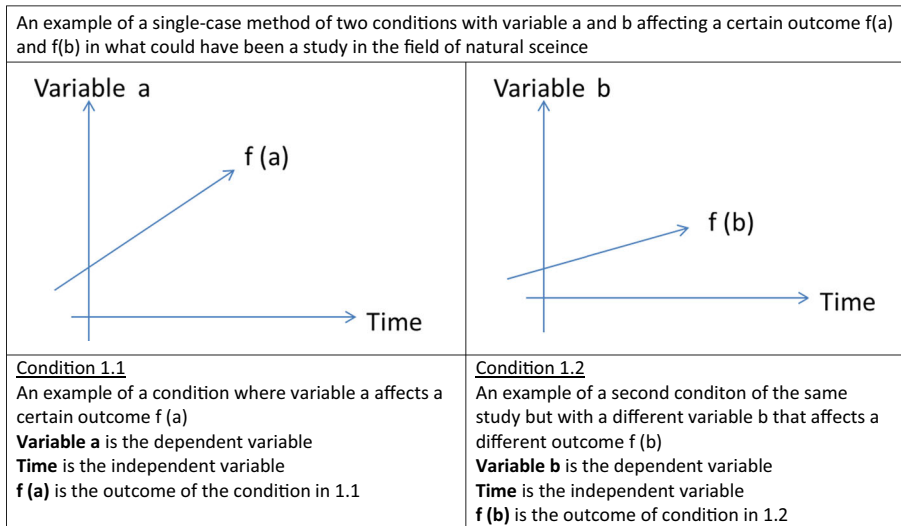


Fig. 1 An example of a single-case method of two conditions with variable a and b affecting a certain outcome f(a) and f(b) in what could have been a study in the field of natural science

the relation between the dependent and independent variables in phenomenological experiencing where previously experiences might affect future experiencing and in this

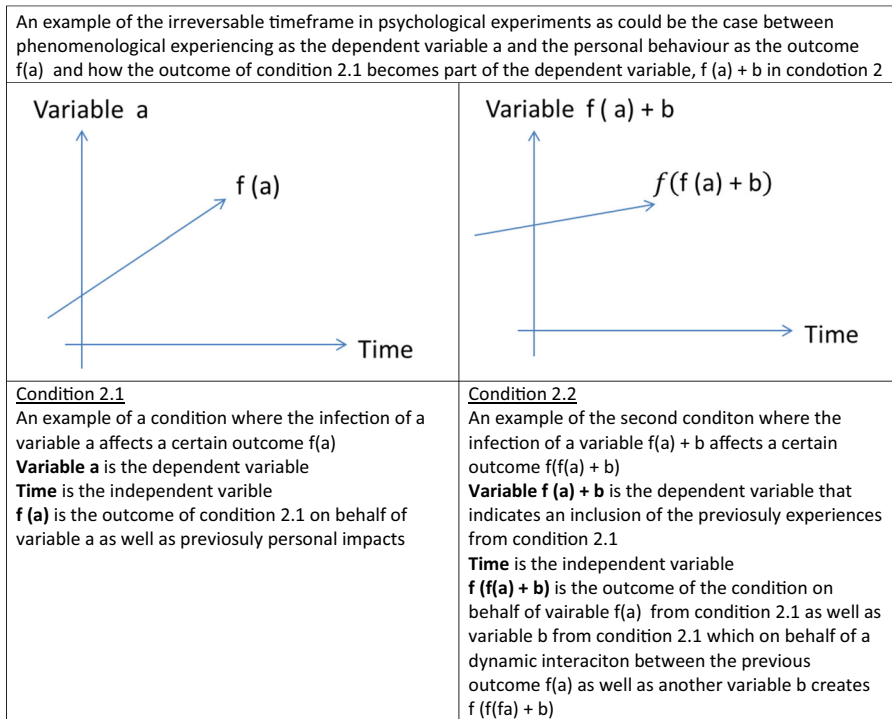


Fig. 2 An example of the irreversible timeframe in psychological experiments as could be the case between phenomenological experiencing as the dependent variable a and the personal behaviour as the outcome f(a) and how the outcome of condition 2.1 becomes part of the dependent variable, f (a) + b in condotion 2

way also behaviour. The order of specific experiences that might affect certain behaviour outcomes is hereto challenging to identify.

Given that the outcome $f(a)$ of condition 2.1 in Fig. 2 is linked with the dependent variable in 2.2 the distinction between independent and dependent variables seems effectively eliminated. In this sense the on-going experience of the “independent” time in 2.1 becomes part of the “dependent” variable in 2.2. Thus, the history of experiencing becomes the de facto “independent” factor that due to the impact on the continuing experience “gnaws into the future” with Henri Bergson’s terminology (1889/1910) or in this case gnaws into the irreversible time and becomes part of the “dependent” variable as in condition 2.2. Illustrating this point of view in a simple example could be in relation to the reaction time tasks. Here the stimulus or the independent variable is antecedent to a reaction, which is the dependent variable. Separating the independent and dependent variables is in this case only possible by leaving a blank in between and in this way remove the experience from the study as it happens in reaction time studies which Fig. 1 could be an illustration of. Here the experience between stimuli and reaction is not considered. The intention by illustrating Figs. 1 and 2 is as well to add the experience to phenomenological research or to the “in between” of stimuli and reaction studies. By doing this the on-moving complex of experiencing unites the “independent” and “dependent” variables, leaving their posited (causal) relation moot. Thus, the past feeds into the making of the new present on the basis of anticipating the future.

If the notion of causal thinking instead, is replaced with the notion of catalytic thinking, the “independent variable” would be the catalyst for the present experience, facing the anticipated future (Beckstead et al. 2009; Cabell and Valsiner 2014). Importantly, it seems possible to argue that the stimulus response scheme to some extent has excluded the future by ending the study/item through the outcome as the dependent variable in the traditional time free thinking conditions in experimental psychology. If someone says “I am fine” in response to “how are you?” it is assumed that “I am fine”, thus “being fine” is the outcome rather than the input to a new present such as “am I really fine?”. In this case the act of responding becomes part of the experience that leads the person on in life with the possibility of a life-long search of “am I really fine?”.

The intention of this article is not to stress one phenomenological experiential effect on behaviour more than others but instead to highlight the importance of considering previous experiences as also influencing the current behaviour outcome. In this sense it becomes difficult to incorporate control conditions of phenomenological experiencing and behaviour in psychological research. The following section discusses the temporality as a possibility of rethinking SCM in phenomenological experiencing.

Example of a Study that Might Categorize as SCM with the New Time Perspective in Mind

The relation to music of a group of Brazilian musicians was in a recent study investigated, in particular the local music played by two main bands in Northern Brazil. The intention was to investigate verbal and non-verbal responses respectively to the sound of music played by their own band, the other band in the city and a totally different type of music. Listening to the music was performed as a serial methodology beginning with a short extract of the three different tracks. The timeframe in this study

was rather short without interruptions besides from the change of tracks on the computer as well as a few questions asked after each track. If instead the design of the study took advantage of a broader timeframe such as listening to one of the different tracks once a week in a period of three weeks, the possibility of different results would most likely be present. The question of which timeframe that would be most suitable is therefore raised with the answer probably being both. As described in this article it is important to include the notion of time as both the non-lived objective time and also the living in time and the thereto irreversibility. As indicated in Fig. 2 previous phenomenological experiencing might affect future experiencing and thereto behaviour in such a way that it is much complicated if not impossible to separate the different influencing variables from one another. Separating the variables might as well not be that beneficial as instead acknowledging the complexity associated with phenomenological experiencing. In this sense though only changing one extract of music the behaviour outcome of the musician might be influenced by previously associated stimuli.

With this more nuanced understanding of time in mind the present study here briefly referred to would as well be possible to characterize as a single-case research study. Repeating observation of the same individual over time, which is described as one of the most fundamental requirements of SCM is therefore not neglected. Rather as discussed previously in this article it seems most reasonable to stress that comparing the different experiences of a given phenomenon still should be considered important since it might contribute with a more nuanced understanding of phenomenological experiencing as well as the individual impacts of the apparently appearing stimuli in each condition.

How to Implement in One Design?

To summon up the various considerations in the SCM, as described in this article – a presently on-going research project, performed by Jensine I. Nedergaard, assembles these aspects.

Scars from deep penetrating wounds generate a physical memory, representing a boundary that is explained as highly mentally permeable and hereby originate a platform where identity is created. The goal for this research is to explain if (and then how) deep invasions, creating scars in the skin, become personal-cultural signs that operate as memory devices connecting the personal past with the anticipated future.

The design for this research is a single case study with a woman who has had two Caesarian sections. There is only one scar visible on the woman but she explains herself as having two scars. Both procedures were executed similarly, but her perception and anticipation of the process were very different.

The phenomenon was first carefully studied so to be able to find the best suitable participant. A typical or average scar would not be able to represent the richest information. Often extreme cases reveal more information while they activate more mechanisms in the person or situation being studied. From an understanding-oriented and action-oriented perspective it is important to clarify the deeper consequences of the situation than just describing the symptoms. In this extreme, critical case random samples, stressing representativeness, would not produce the insight as this single case, chosen specifically for its validity (Flyvbjerg 2006).

As Campbell (1975) describes, there is not yet produced a general context-independent theory. Therefore the only thing to offer is a concrete context-dependent knowledge, which the case study is extremely well suited to produce. So to overcome the first misunderstanding of single cases, this project exactly creates concrete, context-dependent knowledge so to allow development from rule-based beginners knowledge into expertise knowledge (Flyvbjerg 2006; Bourdieu 1977). Experiences can be gained via continued closeness to the reality being studied and feedback from those being studied. Using the SCM in this study leads to this closeness so to avoid an inhibited learning process, developed from distance to the studied object and lack of feedback (Flyvbjerg 2006). Also it is possible to generalize from this single case while the two scars represents two different aspects but actually has to be recognized in the view of likeness (Valsiner 2015). In this case the theoretical generalisation consists of generalisation according to the theory, which data can validate, falsify or differentiate. The more complex the theories are the better predictions can be made.

Working with this critical case it is important to detect a “most-likely” or “least-likely” state to either clearly confirm or falsify hypotheses. If the scars on a woman with multiple traumatic experiences from deep invasions, creating only one visible scar, becomes personal-cultural signs that operate as memory devices connecting the personal past with the anticipated future, then most likely this would be the case with others as well.

Diamond (1996) observed that the case study does not apply scientific methods, since he understood methods as a means to bend the researchers own tendencies as to stamp the researchers pre-existing interpretations on the data. As to overcome the fourth misunderstanding, Bacon (1853) idea of this bias toward verification is expressing this phenomenon vnot only related to case studies. He saw the peculiar and perpetual error of how human understands, as to be excited by affirmatives and not by negatives. The advantage of this case study is the ability to zoom in to real-life situations and directly in this forum test views or understandings in relation to phenomena unfolding in practice (Flyvbjerg 2001). At this point it shows that not only verification but certainly also falsification is the very centre of interpretation in the case study. When focusing on this particular case the theory, which is used to explain the differences, also creates predictions of other aspects. Hereby the theory is not retained unless it also is confirmed.

“The case study contains no greater bias toward verification of the researcher’ s preconceived notions than other methods of inquiry. On the contrary, experience indicates that the case study contains a greater bias toward falsification of preconceived notions than toward verification.”

(Flyvbjerg 2006)

Having the irreversible time in mind, this case study in particular shows the necessity of implementing earlier experiences in the idea of anticipating the future as shown in Fig. 2. The woman had a very different anticipation of the first surgery than of the second. The operations were similar, executed at the same hospital by the same doctor – but the time and earlier experiences were different. So the outcome can never be the exact same. The past feeds into the making of the new present on the basis of anticipating the future.

The Inevitable Reconstruction

One implication associated with repeated observation in psychological methodologies over time is an inevitable reconstruction of the original setting. In this way with reservations for the irreversibility of time and the thereto conditions of the primary observation, no observation is ever possible to create exactly as the original. The classical study of serial reproduction of an Egyptian owl hieroglyph by F. C. Bartlett (1932) was used to simulate the circumstances associated with passing on cultural material from one group of people to a foreign group of people (Wagoner 2008, pp. 52–53). Further a recent reproduction of the experiment has pointed at some implications in relation to the timeframe. If the amount of time between the first and second exposure to the stimulus is around a week, the study indicates that a significant distortion of the original material might occur. However if the timeframe in this particular study instead is around 15 min of delay the distortion between the subject's reproductions seems most appropriate (ibid., p. 53). Similar reflections might be worth considering in SCM such as the amount of reproductions necessary and the proper timeframe.

Final Comments

Hurtado-Parrado and López-López specify the general characteristics of SCM in basic and applied research to include; (a) individual experiencing by the participant in both the control conditions and at least one of the independent variable conditions; (b) a continuously assessing of performance over time and under different conditions; (c) stability in performance with the intention of allowing the researcher to test predictions about treatment effects; (d) rejection of accumulated data across the participants; and (e) proclaim of a legitimate scientific interest in behaviour of a single organism and not so much of group effect (Hurtado-Parrado and López-López 2015). Applying a well-integrated methodology from the natural sciences into the field of psychology is challenging. It appears that the above mentioned general characteristics in some sense collide with the current renewed notion of time. Acknowledging the possibility of generalization as well as negotiating the different elements in SCMs seems necessary in order to welcome SCMs as a more applied approach in future psychology. In this respect Hurtado-Parrado and López-López elaborate and differentiate the terminology of SCMs which creates a more nuanced understanding of the terminology as well as advantages of use. Moving on in this respect could be to also rethink the notion of time as it has been proposed in this article.

References

- Bacon, F. (1853). *Novum organum*. In *The physical and metaphysical works of Lord Bacon (Book 1)*. London: H. G. Bohn.
- Bartlett, F. C. (1932). *Remembering. A Study in Experimental and Social Psychology*. Cambridge, Cambridge University Press.
- Becker, H. S. (2000). Generalizing from case studies. In E. W. Eisner & A. Peshkin (Eds.), *Qualitative inquiry in education: the continuing debate* (pp. 233–242). New York: Teachers College Press.
- Beckstead, Z., Cabell, K. R., & Valsiner, J. (2009). Generalizing through conditional analysis: causality in the world of eternal becoming. *Humana Mente*, 11, 65–80.

- Bergson, H./Pogson, F. L. (1910). *Time and free will, an essay on the immediate data of consciousness*. London, S. Sonnenschoin & co., lim.;New York, The Macmillan co, (pp. 1–296).
- Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge: Cambridge University Press.
- Cabell, K. R., & Valsiner, J. (Eds.). (2014). *The catalyzing mind. Beyond models of causality*. New York: Springer. doi:10.1007/978-1-4614-8821-7.
- Campbell, D. T. (1975). Degrees of freedom and the case study. *Comparative Political Studies*, 8(1), 178–191.
- Collier, D., & Mahoney, J. (1996). Insights and pitfalls: selection bias in qualitative research. *World Politics*, 49(1), 56–91.
- Diamond, J. (1996). The Roots of Radicalism. *The New York Review of Books*. 14 November, 1996, pp. 4–6.
- Donmoyer, R. (1990). Generalizability and the single case study. In E. W. Eisner & A. Peshkin (Eds.), *Qualitative inquiry in education: the continuing debate* (pp. 175–200). New York: Teachers College Press.
- Eckstein, H. (2002). Case study and theory in political science. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case study method: key issues, key texts* (pp. 119–163). London: Sage.
- Flyvbjerg, B. (2001). *Making social science matter: Why social inquiry fails and how it can succeed again*. Cambridge: Cambridge University Press.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*. doi:10.1177/1077800405284363.
- Geertz, C. (1973). *The interpretation of cultures: selected essays by Clifford Geertz*. New York: Basic Books Inc.
- Gerring, J. (2006). *Case study research: principles and practices*. Cambridge: Cambridge University Press.
- Goetz, J., & LeCompte, M. (1984). *Ethnography and qualitative design in educational research*. Orlando: Academic.
- Hurtado-Parrado, C., & López-López, W. (2015). Single-case research methods: history and suitability for a psychological science in need for alternatives. *IPBS: Integrative Psychological & Behavioral Science*, 49, 2. doi:10.1007/s12124-014-9290-2.
- Lincoln, Y., & Guba, E. (2002). The only generalization is: there is no generalization. In R. Gomm, M. Hammersley, & P. Foster (Eds.), *Case study method* (pp. 27–44). London: Sage.
- Ramien, K. (2007). *Casestudiet I praksis*. Århus: Forfatteren og Academica.
- Sato, T., & Valsiner, J. (2010). Time in life and life in time: between experiencing and accounting. *In Ritsumeikan Journal of Human Sciences*, 20(1), 79–92.
- Schofield, J. W. (1990). Increasing the generalizability of qualitative research. In E. W. Eisner & A. Peshkin (Eds.), *Qualitative inquiry in education: the continuing debate* (pp. 201–232). New York: Teachers College Press.
- Smaling, A. (1987). *Methodological objectivity and qualitative research*. Lisse: Swets & Zeitlinger.
- Toomela, A. (2009). How methodology became a toolbox – and how it escapes from that box. In J. Valsiner, P. Molenaar, M. Lyra, & N. Chaudhary (Eds.), *Dynamic process methodology in the social and developmental sciences* (pp. 45–66). New York: Springer.
- Valsiner, J. (2015). Generalization is possible only from a single case (and from a single instance). In B. Wagoner, N. Chaudhary, & P. Hviid (Eds.), *Integrating experiences: Body and mind moving between contexts. Niels Bohr Professorship Lectures in Cultural Psychology, Vol 2*. Charlotte: Information Age Publishing.
- VanWynsberghe, R., & Khan, S. (2007). Redefining case study. *International Journal of Qualitative Methods*, 6(2), 80–94.
- Wagoner, B. (2008). Developing “Development” in Theory and Method: A Commentary on Kleine-Horst (2007). In Abbey, E. & Diriwächter, R. (Eds.), *Innovating Genesis. Microgenesis and the Constructive Mind in Action*. Charlotte, Information Age Publishing, Inc.
- Yin, R. K. (2009). *Case study research: design and methods*. London: SAGE Publications Ltd.

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