

A Conceptual Lever and the Narrative Construction of the Cyborg as a Quantum Machine

Sabrina Liccardo

Abstract

Archimedes purportedly announced, "Give me a lever long enough and a fulcrum on which to place it, and I shall move the world." Archimedes was referring to how the use of a lever could provide leverage by amplifying an input force to create a greater output force executed against an object. Thus, the basic elements of a lever include effort, load or resistance, a lever arm, pivoting point and a fulcrum. In this theoretical paper, I have mapped several concepts onto the following elements of a lever; the psychological world onto '*effort*', the socio-material world onto '*load*', history, culture, and tradition onto the '*lever arm*', temporality onto the '*pivoting point*', narratives onto the '*fulcrum*' and a 'chronotope' onto the '*ground*'. Who is the 'One' that attempts to move the 'other' and how does he use the elements of a 'lever' to do so? In a phallocratic culture, the difference between a set of dualities is constructed as binary opposites and the positive terms, which dominate the binary, are linked to one particular sex. Thus, man (the 'One') is valued over woman (its negative 'other'). If we are to transform culture we need to destabilise the binary opposition that is founded in the male/female couple (Cixous, 1981). Thus, in this paper I compare mechanical nature of a lever with the dichotomous patriarchal social system, in which the masculine dominates the construction of meaning. I use the elements of a 'lever' to illustrate how the reproduction of a phallocratic culture might occur. This patriarchal social system follows the principles of digital computing in that it encodes 'data' that are associated with the masculine and feminine into binary oppositions. However, the 'cyborg' (Haraway, 1991) as a quantum machine, can exist in more than one state simultaneously. The cyborg maintains a state of 'quantum superposition' and 'quantum entanglement' because when it is in one state of a binary, it partly exists in the other state simultaneously. Due to this entanglement, each member of the binary must be delineated relative to one another. I thus conceptualise the cyborg at the centre of this lever as it embodies the self as a psychological, socio-material and cultural phenomenon thus providing an interpretive entry point to understanding ontology as the entanglement of subject and object, space and time, matter and meaning, history and fiction. Furthermore, the cyborg utilises narratives (stories) to reconstruct identity in the interplay of duality.

Keywords: binary oppositions, diffraction, cyborg, quantum superposition and entanglement, narrative identity, tradition and time-space.

Introduction

I have divided this theoretical paper into seven components. I begin the discussion with the practice of diffractive (Barad, 2007), which has been adopted in order to weave a polyphonic tapestry out of multi-disciplinary identity threads and diffractive patterns. Secondly, I explicate why multiple theoretical perspectives have been mapped onto the metaphor of a lever and the cyborg (Haraway, 1991). Next, I demonstrate that in a phallographic culture the difference between a set of dualities is constructed as binary opposites and the positive terms, which dominate the binary, are linked to one particular sex. Man is valued over woman (its negative other). If we are to transform culture we need to destabilise the binary opposition that is founded in the male/female couple (Cixous, 1981). Thus in the fourth component of this paper, I explicate how the elements of a 'lever' could be used to portray the reproduction of a phallographic culture. I then discuss how Haraway's (1991) notion of the cyborg is situated in a 'third space' (Bhabha, 2004) as it offers a way out of the dualistic traditions that have created boundaries between self/other, human/animal, organism/machine, culture/nature, physical/non-physical, and male/female. Building on the previous discussion of how a dichotomous patriarchal social system could be compared to the mechanical nature of a lever, I argue that this patriarchal social system follows the principles of digital computing in that it encodes 'data' that are associated with the masculine and feminine into binary oppositions. However, I theorise the 'cyborg' (Haraway, 1991) as a quantum machine, as it can exist in more than one state simultaneously. The cyborg maintains a state of 'quantum superposition' and 'quantum entanglement' because when it is in one state of a binary, it partly exists in the other state simultaneously. Due to this entanglement, each member of the binary must be described relative to one another. Lastly, I elucidate how the cyborg utilises narratives to reconstruct identity in the interplay of these dualities.

The practice of diffraction

In line with the annual UEL yearbook title, "Crossing Conceptual Boundaries" I have adopted a diffractive methodology in reading identity through multi-disciplinary concepts in an attempt to "make evident the entangled structure of the changing and contingent ontology of the world, including the ontology of knowing" (Barad, 2007, p. 73). Barad (2012) notes that the entanglement of matter and meaning become evident in the "resonances and dissonances" (p. 50) of multiple interacting domains. Geometrical optics which is "completely agnostic about whether light is a particle or a wave or anything else" (ibid, p. 52) deliberates the subject as separate to the object; thus, knowledge is created at a distance. Whereas, in physical optics, diffraction enables one to examine the object as well as the apparatus, resulting in the entanglement of the subject and object (ibid). Barad writes: "Diffraction, understood using quantum physics, is not just a matter of interference, but of entanglement, an ethico-onto-epistemological matter ... It underlines the fact that knowing is a direct material engagement" (ibid, p. 52).

In this paper, I do not use the practice of diffraction to theorise identity but rather as a tool to weave a polyphonic tapestry out of multi-disciplinary identity threads. These conceptual threads include the following; binarism (Rutherford, 1990; Barret, and Phillips, 1992; Cixous, 1981), cyborg (Haraway, 1991), digital and quantum computing, quantum superposition and entanglement, culture (Kuhn, 2002), tradition (Gadamer, 1982; Ricoeur, 1991), belonging (Yuval-Davis, 2011), imagined communities (Anderson, 1996), narrative (Andrews, Squire and Tamboukou, 2008; Bruner, 2002; Crites, 1986; Fay, 1996; Freeman, 1993; Josselson, 1995; McAdams, 1993; Polkinghorne, 1988; Reissman, 2008), idem-identity and ipse-identity (Ricoeur,

1991), narrative identity (Ricoeur, 1988; 1991), temporality, and chronotope (Bakhtin, 1981).

A metaphorical lever as a conceptual matrix of binary oppositions

These multiple theoretical perspectives have been mapped onto the metaphor of a lever and the cyborg (Haraway, 1991) for two reasons; firstly to determine the relational functionality of each element in the reproduction of a phallocratic culture and secondly to identify diffractive patterns in the formation of narrative identity. As mentioned, Archimedes purportedly said, "Give me a lever long enough and a fulcrum on which to place it, and I shall move the world." Archimedes was referring to how the use of a lever could provide leverage by amplifying an input force to create a greater output force executed against an object. Thus, the basic elements of a lever include effort, load or resistance, a lever arm, pivoting point and a fulcrum. I have conceptualised a diagram (see figure 1) that projects several concepts onto the following elements of a lever; the psychological world onto '*effort*', the socio-material world onto '*load*', culture, and tradition onto the '*lever arm*', temporality onto the '*pivoting point*', narratives onto the '*fulcrum*' and a 'chronotope' onto the *ground*. Who is the 'One' that attempts to move the 'other' and how does he use the elements of a 'lever' to do so?

Feminist theory is concerned with deconstructing the hierarchical binary oppositions that underpin Western culture (Barret and Phillips, 1992). Phallocentric patriarchies and dualistic traditions, which privilege the masculine and follow the logics of "domination of women, people of colour, nature, workers, animals" persist (Haraway, 1991, p. 177). Haraway (ibid) notes:

To be One is to be autonomous, to be powerful, to be God; but to be One is to be an illusion, and so to be involved in a dialectic of apocalypse with the other. Yet to be other is to be multiple, without clear boundary, frayed, insubstantial. One is too few, but two are too many.

In a phallocratic culture, the difference between a set of dualities is constructed as binary opposites: culture versus nature, psychological versus social, reason versus emotion, whiteness versus blackness, mind versus body, active versus passive, subject versus object, self versus other, and male versus female. The hierarchal system of false polarities is created so the positive terms, which dominate the binary, are linked to one particular sex; thus, man (the 'One') is valued over woman (its negative 'other'). Males are situated in privileged positions of domination in a patriarchal social system as they occupy the space of culture, psyche, reason, 'whiteness', active, mind, subject, self, and sameness whereas women are set aside to occupy the space of nature, social, emotion, 'blackness', passive, body, object, other, and difference.

Echoing this view, Cixous (1981, p. 44) contends that if we are to transform culture we need to destabilise the binary opposition that is founded in the male/female couple:

In fact, in every theory of culture, every theory of society, the whole conglomeration of symbolic systems –everything, that is, that's spoken, everything that's organised as discourse, art, religion, the family, language ... it is all ordered around the hierarchical oppositions that come back to the man/woman opposition, an opposition that can only be sustained by means of a difference posed by cultural discourse as 'natural'.

I propose that the elements of a 'lever' (see figure 1) could be used to portray the

reproduction of a phallocratic culture. The dichotomous patriarchal social system, which privileges the masculine in meaning making, is compared to the mechanical nature of a lever. I have placed the positive terms that are associated with the masculine on the dominant side of the lever arm that represents the self or '*effort/meaning making*'. Analogously, I have projected the negative terms that are associated with the feminine on the side that represents the other or '*resistance*'. Over time, individual memories extend into a web of meanings that bind the material/symbolic, social/personal, and historical/psychical. This network of interconnections coalesces in individual life narratives (Kuhn, 2002). The intertwining of personal and public histories that form cultural memory form the terrain, as represented by a '*lever arm*', of people's 'historically effected consciousness' (Gadamer, 1982). Narratives, as represented by the '*fulcrum*', are the point on which culture (i.e. *lever arm*) pivots.

Thus through tradition, we inherit prejudices or "fore-meanings" (Gadamer, 1982) that constitute our being. Tradition serves as the terrain for understanding and provides a 'horizon' or larger context of meaning from which we may view the world (Gadamer, 1982). Gadamer insists that prejudices, which are open to change, should be continually subjected to critical examination, "True prejudices must still finally be justified by rational knowledge" (p. 242). Tradition is constituted by the interaction of sedimentation and innovation, as "[t]he phenomenon of traditionality is the key to the functioning of narrative models and, consequently, of their identification" (Ricoeur, 1991b, p. 24). Accordingly, through the play of sedimentation and innovation, we continually participate in producing, determining, and creating new ways of belonging to tradition. "Tradition is not simply a precondition into which we come, but we produce it ourselves, inasmuch as we understand, participate in the evolution of tradition and hence further determine ourselves" (Gadamer, 1982, p. 261). Belonging is constructed through narratives (stories) of individual and collective identities and emotional attachments (Yuval-Davis, 2011).

In addition, belonging is affected by the ways in which social locations and identities are valued and judged by society (Yuval-Davis, 2006). Social locations not only refer to people's positionality in the intersections of social divisions (i.e. 'race', gender, class, age, sexuality etc.) but also the positionality of categories along an axis of power in society, which changes with different historical moments and contexts (ibid). Hegemonic political powers maintain and reproduce categories of social divisions by the construction of boundaries that determine the standards of 'normality' and access to economic, political, social, intellectual, and cultural capital (Yuval-Davis, 2006; Bourdieu, 1983).

As the masculine dominates the construction of meaning in a phallocratic culture, narratives (stories) may be used as a tool to "reverse and displace the hierarchical dualisms of naturalized identities" (Haraway, 1991, p. 175). When narratives are used to assemble varied possibilities of meaning into fixed dichotomies it creates binaries, which reduce the "potential of difference into polar opposites" (Rutherford, 1990, p. 21). Following Rutherford's (1990) insight into binarism, he states that it:

operates in the same way as splitting and projection: the centre expels its anxieties, contradictions and irrationalities onto the subordinate term, filling it with the antithesis of its own identity; the Other, in its very alienness, simply mirrors and represents what is deeply familiar to the centre, but projected outside of itself (p. 22).

Rutherford posits that when new identities that attempt to "break the logic of the otherness of binarism" (p. 22) are produced on the margins they are unable to fully articulate their own and others' experiences. As a result, language becomes a site of struggle because political ideologies attempt to protect the status of meaning from new identities that threaten to

deconstruct “those forms of knowledge that constitute the subjectivities, discourses and institutions of the dominant, hegemonic [and phallogocentric] formations” (ibid). Williams (1989) delineates this “struggle for a voice as being at the very edge of semantic availability” (as cited in Rutherford, 1990, p. 22).

The cyborg as a quantum machine: superposition and entanglement

Kristeva (as cited in Moi, 1988, p. 6) recommends that feminist critique should be situated in a “third space: that which deconstructs [and denaturalises] all identity, all binary oppositions, all phallogocentric positions” and reveal the mechanisms of oppression in ideologies that are produced by phallogocentric patriarchies. The aim is not to reverse or synthesise the binary oppositions, as this would maintain a hierarchical structure but rather to collapse them or find a way to accentuate their coexistence. I argue that Haraway’s (1991) notion of the cyborg, a “cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction” (p. 149) is situated in this ‘third space’ as it offers a way out of the dualistic traditions that have created boundaries between self/other, human/animal, organism/machine, culture/nature, physical/non-physical, and male/female. Haraway writes:

Cyborg politics is the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly, the central dogma of phallogocentrism ... Cyborg writing is about the power to survive, not on the basis of original innocence, but on the basis of seizing the tools to mark the world that marked them as other. The tools are often stories, retold stories, versions that reverse and displace the hierarchical dualisms of naturalized identities. In retelling origin stories, cyborg authors subvert the central myths of origin of Western culture ... Feminist cyborg stories have the task of recoding communication and intelligence to subvert command and control (p.175).

As discussed, the elements of a ‘lever’ could be used to depict the reproduction of a phallogocentric culture. I argue that a patriarchal social system (as represented by a mechanical lever) follows the principles of digital computing in that it encodes data into binary digits. However the cyborg, as a quantum machine, can exist in more than one state simultaneously. Put differently, digital computing obeys the laws of classical physics and requires data to be encoded into binary digits or bits (i.e. a unit of information that is represented as 0 or 1). However, quantum computing harnesses phenomena in quantum mechanics to perform operations on data and create a new mode of information processing. Its unit of information (i.e. quantum bit or qubit) is not binary but quaternary as a qubit can exist as a 0 or 1 or both 0 and 1 simultaneously (Dirac, 1947). This phenomenon is called ‘quantum superposition’ which maintains that when a physical system is in one state, it partly exists in each of two or more other states simultaneously (Dirac, 1947). Another phenomenon (which is a product of superposition) is called ‘quantum entanglement’. Schrödinger (1935, p. 555) notes:

When two systems, of which we know the states by their respective representatives, enter into temporary physical interaction due to known forces between them, and when after a time of mutual influence the systems separate again, then they can no longer be described in the same way as before, viz. by endowing each of them with a representative of its own. ... By the interaction the two representatives have become entangled.

The binary oppositions that are associated with the masculine and feminine are

represented as two states, 0 and 1 respectively (see figure 1). I argue that the cyborg maintains a 'quantum superposition' because when it is in one state of a binary, it partly exists in the other state simultaneously. Identity is (re)constructed in the interplay and entanglement of these dualities. I thus conceptualise the cyborg at the centre of this lever as it embodies the self as a psychological, socio-material and cultural phenomenon thus providing an interpretive entry point to understanding ontology as the entanglement of subject and object, space and time, matter and meaning, history and fiction. When one state (e.g. organism) interacts with the other (e.g. machine), each member of the binary must then be delineated relative to one another.

The cyborg imagery entangles these dualistic traditions by illuminating our embodiment of machines as an aspect of our being as well as the possibility of rewriting our bodies and history and creating new ways of being and knowing (Haraway, 1991). Identities are understood as relational, and (re)constructed in networks of relationships with others and language in time (Crites, 1986; Fay, 1996; Freeman, 1993). Thus, cyborg politics is a "powerful infidel heteroglossia" (Haraway, 1991, p. 181) that necessitates "both a destroying and a building of machines, identities, categories, relationships, space stories" (ibid) as well as being open to the "pleasure in the confusion of boundaries and [the] responsibility in their construction" (ibid, p. 150).

The narrative construction of identity in the interplay of duality

I now explore how the cyborg utilises narrative to reconstruct identity in the interplay of these dualities. I claim that narratives create the possibility for multiple selves to emerge in response to duality. As illustrated in figure 1, 'identity as sameness' (or idem) contains elements of self and other whereas the interplay between the same and other is ipseity or 'identity as self' (Ricoeur, 1991). The dual aspects of self and other in idem-identity enable the cyborg to approach the question 'what am I?' through the interplay of sameness and otherness.

Ricoeur (1991a) differentiates between the following four senses of 'identity a sameness': "Identification as re-identification of the same," extreme resemblance, discontinuity and "permanence over time" (p. 74). The fourth sense, 'permanence over time' causes problems to ipseity or the self because of the tendency to attribute "some immutable substrate" to this permanence (ibid). Ipseity and sameness overlap when one poses the question of 'who' in the domain of action, the action belongs to the agent or the self who did it (Ricoeur, 1991a). "Indeed it is legitimate to ask what sort of permanence belongs to a self in light of ascription ... this self constancy ... seems to be to the permanence over time of the idem" (ibid, p. 75).

This 'self constancy' offers a way out of sameness and otherness because the narrative plot facilitates the mediation of permanence and change which creates a model of "discordant concordance" (Ricoeur, 1991b, p. 32) upon which narrative identity may be constructed. Ricoeur (1988) remarks:

Self-sameness, 'self-constancy' can escape the dilemma of Same and Other to the extent that its identity rests on a temporal structure that conforms to the model of dynamic identity arising from the poetic composition of a narrative text. The self characterised by self-sameness may then be said to be refigured by the reflective application of such narrative configurations. Unlike the abstract identity of the Same, this narrative identity, constitutive of self constancy, can include change, mutuality, within the cohesions of one lifetime (p. 246).

The cyborg maintains a state of ‘quantum superposition and entanglement’ because when it is in the state of ‘ipseity’, it partly exists in the other state of ‘idem-identity’ simultaneously. Due to this entanglement, ‘ipseity’ and ‘idem-identity’ must be described relative to one another. As illustrated in figure 1, narratives (i.e. *fulcrum*) is the point on which the cyborg is supported and on which culture (i.e. *lever arm*) pivots with time. Through narrative, cultural histories become socially embodied in the cyborg and embedded in temporality; thus, the cyborg epitomises the entanglement of the self and society, subject and object, culture and nature, matter and meaning, space and time, history and fiction.

“This cyborg is our ontology; it gives us our politics” (Haraway, 1991, p. 150) as it could be read as a history of our present state. I claim that the cyborg utilises narratives to destroy naturalised boundaries, subvert phallogocentric patriarchies, create new ways of belonging to tradition, as well as make sense of her temporal experience and answer the question ‘Who am I?’ “To answer the question ‘Who?’... is to tell the story of a life. The story told tells about the action of the ‘who’. And the identity of this ‘who’ therefore itself must be narrative identity” (Ricoeur, 1988, p. 246).

The activity of life through time is enacted in our psychosocial world which provides us with a lifetime of existential and material ‘data’ that we embody by reflecting on memories, and intentions during moments in which the questions, ‘*What am I doing?*’ and ‘*Why am I doing this?*’ compels us to make sense and meaning “to the primal stew of data which is our daily experience. There is a kind of arranging and telling and choosing of detail - of narration” (Rose, 1983, p. 6). Accordingly, if the “‘first order’ activity of lives as they are lived is mirrored in ‘second order’ activities of reflection, representation, accounting and storytelling” (Andrews, 2004, p. 7). The question ‘*What am I doing?*’ is then answered in the form a story about ‘*why am I doing this?*’ Our answerability takes the form of narratives which could be described as “discourses with a clear sequential order that connect events in a meaningful way for a definite audience and thus offer insights about the world and/or people’s experiences of it” (Hinchman and Hinchman, 1997, p. xvi).

In figure 1, narratives are situated on a ‘*chronotope*’ because they are always told in relation to the self and other and in the context of a specific time and place. Bakhtin (1981) coined the term ‘chronotope’ translated from the Greek ‘*chronos*’ (time) and ‘*topos*’ (place) which means a ‘moment’ or reality in time-space (that is described by language and literature in particular), or as he elucidates: “the intrinsic connectedness of temporal and spatial relationships that are artistically expressed in literature [and in life] ... spatial and temporal indicators are fused into one carefully thought-out, concrete whole.” (p. 84).

Constructing a life story or ‘fictive history’ requires imagination when organising and interpreting unrelated elements (events, actions, others, contexts) that follow the principles of ‘emplotment’ in which “sequences of events with beginnings, middles and ends, and generate intelligibility by organising past, present and future in a coherent way” (Ricoeur, 1984, 1985, 1988 as cited in Andrews 2004, p. 7). The notion of narrative identity, which is up bound in time, integrate both historical and fictional narrative as lives become more readable or intelligible when cyborgs use narrative models or plots from history and fiction to tell life stories (Ricoeur, 1991b). Thus, the struggle between sedimentation and innovation that constitutes tradition can be applied to our self-understanding (Ricoeur, 1991b). Therefore, cyborgs continually use culture to reinterpret their narrative identity. It is thus narrative interpretation that provides “‘the figure-able’ character of the individual which has for its result, that the self, narratively interpreted, is itself the figured itself – a self which figures itself as this or that” (Ricoeur, 1991a, p. 80). The narrative construction of cyborg identity recognises the uniqueness of individual subjects, their intimacy with boundaries, and relationality with others, and the inseparability of technology as both a cultural fiction and material reality.

Conclusion

In conclusion, I have used the elements of a 'lever' to portray how the (re)production of a phallocratic culture might occur. The dichotomous patriarchal social system in which the masculine dominates the construction of meaning has been compared to the mechanical nature of a lever. I mapped the positive terms that are associated with the masculine on the dominant side of the lever arm that represents the self or 'effort/meaning making'. Analogously, the negative terms that are associated with the feminine were mapped on the side that represents the other or 'resistance'. The intertwining of personal and public histories that form cultural memory form the terrain, as represented by a 'lever arm', of people's 'historically effected consciousness' (Gadamer, 1982). Narratives, as represented by the 'fulcrum', are the point on which culture (i.e. lever arm) pivots. I then explicated that through tradition, we inherit prejudices or "fore-meanings" (Gadamer, 1982) which should be continually subjected to critical examination. However, as the masculine dominates the construction of meaning in a phallocratic culture, narratives (stories) may be used to assemble varied possibilities of meaning into fixed dichotomies, which reproduce binaries. I have argued that this patriarchal social system follows the principles of digital computing in that it encodes 'data' that are associated with the masculine and feminine into binary oppositions. However, the 'cyborg' (Haraway, 1991) as a quantum machine, can exist in more than one state simultaneously. The cyborg maintains a state of 'quantum superposition' and 'quantum entanglement' because when it is in one state of a binary, it partly exists in the other state simultaneously. Due to this entanglement, each member of the binary is delineated relative to one another. Thus at the centre of this lever, I conceptualised the cyborg as it embodies the self as a psychological, socio-material and cultural phenomenon thus providing an interpretive entry point to understanding ontology as the entanglement of subject and object, space and time, matter and meaning, history and fiction. The cyborg utilises narratives to reconstruct identity in the interplay of these dualities. Whereas 'identity as sameness' (or idem) contains elements of self and other, the interplay between the same and other is ipseity or 'identity as self' (Ricoeur, 1991a). Following Ricoeur (1991b), I assert that 'self constancy' offers a way out of sameness and otherness because the narrative plot facilitates the mediation of permanence and change, which creates a model of "discordant concordance" (p. 32) upon which narrative identity may be constructed.

Acknowledgements

I would like to thank my supervisors, Professor Jill Bradbury and Professor Maria Tamboukou for giving me the invaluable opportunity to work with them on my PhD project, of which this theoretical paper forms a small part. I am indebted to them for their patient guidance, critical advice, encouragement and constant support. I am also grateful to the reviewers for their valuable comments and suggestions.

References

- Anderson, B. (2006) *Imagined communities: Reflections on the origin and spread of nationalism*. London: Verso.
- Andrews, M. (2004). *The Uses of Narrative: Explorations in Sociology, Psychology, and Cultural Studies*. Transaction Publishers.
- Andrews, M, Squire, C., and Tamboukou, M. (Eds.). 2008. *Doing Narrative Research*. SAGE Publications Ltd.
- Bakhtin, M.M. 1981 [1930's]. *The dialogical imagination: four essays*. (M. Holquist, Ed., C. Emerson & M. Holquist, Trans.). Austin, TX: University of Texas Press.
- Barad, K. (2007). *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.
- Barad, K. (2012). Interview with Karen Barad. In Van der Tuin, I., & Dolphijn, R. (2012). New Materialism: Interviews & Cartographies. *New Metaphysics*, 1–195.
- Bhabha, H. K. (2004). *The location of culture*. London; New York: Routledge.
- Bourdieu, P. (1983) [1997]. The Forms of Capital. In *Education: Culture, Economy, and Society*, edited by A. H. Halsey et al. New York: Oxford University Press.
- Bruner, J. (2002). *Making Stories: Law, Literature, Life*. Cambridge: Harvard University Press.
- Cixous, H. (1981). Castration or Decapitation. Trans. and Introd. Annette Kuhn. *Signs: Journal of Women in Culture and Society* 7 (1), 41-55.
- Crites, S. (1986). Storytime: Recollecting the past and projecting the future. In T. Sarbin (Ed.), *Narrative Psychology*. New York.: Praeger.
- Dirac, P. (1947). *The Principles of Quantum Mechanics (2nd edition)*. Clarendon Press.
- Fay, B. (1996). *Contemporary philosophy of social science: a multicultural approach*. Wiley-Blackwell.
- Freeman, M. (1993). *Rewriting the Self: History, memory narrative*. London: Routledge.
- Gadamer, H. (1982). *Truth and Method*. New York: Crossroads
- Haraway, D. (1991). *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*. New York: Routledge.
- Hinchman, L. P and Hinchman, S. K. (1997). 'Introduction', in Hinchman, L. P and Hinchman, S. K. (eds). *Memory, Identity, Community: the Idea of Narrative in the Human Sciences*. New York: State University of New York. pp. Xiii –xxxii.
- Josselson, R. (1995). *Empathy, Narrative and the Dialogic Self in Interpreting Experience: The Narrative Study of Lives (Vol. 3)*. London: Sage.
- Kuhn, A. (2002). *Family Secrets: Acts of Memory and Imagination*, London and New York, Verso.
- McQuillan, M. (2000). *The Narrative Reader*. Routledge.
- McAdams, D.P. (1993). *The Stories we live by: Personal Myths and the Making of the Self*. New York: Guildford.
- Moi, T. (1988). Feminism, Postmodernism, and Style: Recent Feminist Criticism in the United States. *Cultural Critique*, (9), 3.
- Polkinghorne, D.E. (1988). *Narrative Knowing and the Human Sciences*. Albany: Suny.
- Reissman, C.K. (2008). *Narrative Methods for the Human Sciences*. Thousand Oaks: Sage
- Renes, J. M. (2012). *The Physics of Quantum Information: Complementarity, Uncertainty, and Entanglement*. Habilitation thesis, TU Darmstadt, Cornell University.
- Ricoeur, P. (1984). *Time and Narrative, Volume 1*. Chicago and London: University of Chicago Press.
- Ricœur, P. (1985). *Time and Narrative, Volume 2*. Chicago and London: University of Chicago Press.
- Ricœur, P. (1988). *Time and Narrative, Volume 3*. Chicago and London: University of Chicago

- Press.
- Ricoeur, P. (1991a). Narrative identity. *Philosophy today*, 35(1), 73–81.
- Ricoeur, P. (1991b). Life in Quest of Narrative. In Wood, D. *On Paul Ricoeur: Narrative and Interpretation*. Routledge. pp. 20 – 33.
- Rose, P. (2010). *Parallel Lives: Five Victorian Marriages*. Knopf Doubleday Publishing Group.
- Schrödinger, E. (1935). *Discussion of Probability Relations Between Separated Systems*. Proceedings of the Cambridge Philosophical Society 31: 555-63.
- Yuval-Davis, N. (2006). Belonging and the politics of belonging. *Patterns of Prejudice*, 40(3), 197–214.
- Yuval-Davis, N. (2011). *The Politics of Belonging: Intersectional Contestations*. Thousand Oaks, CA: SAGE Publications Ltd.

Born in Johannesburg in 1982, Sabrina Liccardo completed a MA (Research Psychology) at the University of the Witwatersrand. She is currently a PhD candidate at the School of Human and Community Development, University of the Witwatersrand. Sabrina was a visiting research scholar at the University of East London for one year on a Commonwealth Split-site Doctoral Scholarship. Her PhD project is on the life histories of Black South African women scientists. The focus is on Black women's experiences as science students and graduates within Higher Education Institutions in South Africa and the ways in which they navigate institutional spaces that have historically been dominated by white men and specific privileged forms of knowledge production processes. She has used a narrative method to enquire into the lives of these young women, with the aim to critically examine how they traverse spatially embodied boundaries within white and male dominated spaces into 'other spaces' by reconfiguring ideological and cultural borders. Essentially, the project explores questions of discursive, material and symbolic elements that emerge within their narratives across temporal shifts, how these come to reflect specific subjectivities and intersectional identities, and what these collective stories may be able to tell us about new 'imagined communities'. Her research interests lie in auto/biographical narratives, narrative research and identity, subjectivity, feminist studies, higher education and transformation, and visual arts.

Contact details:

Sabrina Liccardo, *School of Human and Community Development, University of the Witwatersrand, Johannesburg, South Africa.*
 Email: sabrina.liccardo@gmail.com
 Private Bag 3,
 Wits 2050 , Johannesburg, South Africa