

# Engaging Robots as Nursing Partners in Caring: Nursing as Caring Meets Care-Centered Value-Sensitive Design

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**Abstract:** Given global proliferation of healthcare robots in hospital and home settings, guidance for shared nurse–robot practice is essential if nurses are to be influential participants in the design, implementation, and evaluation of this new practice partnership. Van Wynsberghe’s Care-Centered, Value-Sensitive Design-approach, grounded in ethical theory and healthcare robotics, was identified as a likely fit with the grand nursing theory of Nursing as Caring. Following analysis of congruence and dissonance, a model for a new middle range theory was developed. The Dance of Living Caring has the potential to maintain caring as nursing’s central value as robotic technology advances.

**Keywords:** Nursing as Caring; care-centered value-sensitive design; nurse–robot partners in caring; dance of living caring

It is increasingly recognized that the emerging technological advances in robotics will make healthcare robots a viable option for a range of practices in the healthcare domain, practices such as surgery, delivery of resources, personal care, and tele-presence and communication. These advances will bring about significant changes in the practice of nursing. Books about robots and nursing are being written (e.g., see Tanioka, Osaka, Locsin, Yasuhara, & Ito, 2017; van Wynsberghe, 2015), entire issues of prominent nursing journals

are focusing on this emerging reality (e.g., *Journal of Nursing Scholarship, Asian and Pacific Islander Journal of Nursing, Advances in Nursing Science*) and several nursing and technology conferences have focused on the topic of robots in healthcare as well (e.g., 2018 Summer Academy of the Anne Boykin Institute for the Advancement of Caring in Nursing; 2nd International Seminar and Workshop of the Rozzano Locsin Institute for Advancing the Theory of Technological Competency as Caring in Nursing; 2018 University of Leeds Faculty of

Engineering *Robotics in Healthcare*). Theorists at the intersection of advanced robotic technology and caring science for nursing and other human service disciplines have begun to address ethical and human rights issues of implementation (Barnard, 2016; Borenstein & Pearson, 2010; Locsin & Ito, 2018; Locsin & Purnell, 2015; Sharkey & Sharkey, 2012; Sparrow & Sparrow, 2006; Vallor, 2011). Even though robots of various types are being introduced into healthcare settings as care partners, there is little in the literature to guide nurses in effective participation in design, implementation, and evaluation of robots as partners in caring in nursing situations.

### **Purpose**

The purpose of this article is to explore the intersections of the values and assumptions underpinning two frameworks, Boykin and Schoenhofer's (2001) Theory of Nursing as Caring (NAC) and van Wynsberghe's (2015) Care-Centered Value-Sensitive Design (CCVSD); to illuminate areas of convergence and divergence in these frameworks; and to model a middle range theory that reconciles divergences, maximizes convergence, and provides specific guidance to nurses in nursing situations with robotic practice partners. In recognition of the lack of consensus about the classification and meaning of "robot" in this evolving field, it is beyond the scope of this article to assert a universal definition of healthcare robots. We proceed from the notion that a healthcare robot is "other than fully human," for example, an intelligent machine, a robot, humanoid, or something in between or beyond. We posit the following assumption regarding the entity addressed in this work: the robotic partner would be expected to participate usefully/effectively in recognizing calls for caring and responding with ways of caring that are appropriate to the situation, such that the one cared for experiences a sense of being cared for, not merely attended to, but cared for as one who is known and who matters.

While robotics design is recognized as a multidisciplinary practice, rarely are all the relevant stakeholders present at the design table. In some instances, patients' opinions are sought for usability issues, as in the case with many rehabilitation robots. Surgical care providers were surveyed by Van Koughnett et al. (2009) in a study of surgeons' assessment of advantages of a robotic approach

to laparoscopy. However, to date there are few academic articles that seek the opinions of nurses to feed into requirements for design and implementation. Given that nurses will often be the predominant users of healthcare robots (van Wynsberghe, 2015), it is necessary to seek their knowledge and expertise in the design and implementation process to help assure the addition of a practice partner capable of enhancing caring in nursing situations. To do this effectively, new theoretical models for nursing are needed.

### **Approach to a Middle Range Theory Grounded in Caring**

Coherent systems and protocols to guide nursing practice are best grounded in general nursing theoretical frameworks, supported by middle range theories and models. Middle range theories, models, and practical protocols need to be value-congruent with the broad nursing theoretical frameworks that guide the practice of nursing in institutions and by individuals and groups of nurses. It is our intention in this article to propose a middle range theory that integrates NAC (Boykin & Schoenhofer, 2001) and CCVSD (van Wynsberghe, 2016, 2015). The aim is to develop a theory to help nursing professionals at all levels reimagine and clarify their own role and practice as nurse-in-partnership with a healthcare robot. The focus of this article is not on modifying CCVSD, nor on changing NAC, but in selecting concepts and relationships from CCVSD that are congruent with the foundations of NAC, relevant to healthcare robots. The intent here is not to critique CCVSD per se, but to analyze it for "fit" with the broader nursing perspective of NAC. Ideas/concepts from the CCVSD framework that are addressed under divergences will be reframed in order to be fully compatible with the values and assumptions of NAC.

### **The Theory of NAC**

Boykin and Schoenhofer's (2001) NAC is an extant grand nursing theory in use globally today. It is based on several assumptions, the most central being that persons are caring by virtue of their humanness (p. 11), or as Roach (2002) declared, "caring is the human mode of being" (p. 3). Further, their understanding of caring was informed by Mayeroff's (1971) assertion that caring is helping others grow and actualize themselves, helping

them live the meaning of their own lives. The focus of the discipline and practice of nursing, from the perspective of the theory of NAC, is this: nursing is nurturing persons living caring and growing in caring. Each person is recognized as caring and the nurse lives a commitment to knowing the one nursed as caring and responding to calls for caring. Nursing is practiced in the relationship of the nursing situation, the shared lived experience of caring between nurse and nursed that enhances personhood, that is, living grounded in caring (Boykin & Schoenhofer, 2001). Nurses enter the world of the nursed with the intention of knowing the person as caring, hearing calls for caring and creating caring responses specific to the situation (Boykin & Schoenhofer, 2001).

### Care-Centered Value-Sensitive Design

Van Wynsberghe's (2016, 2015) CCVSD approach is an intentional response to the design, development, and implementation of robots in healthcare. These robots may be used to aid a variety of healthcare practitioners (e.g., surgical robots to assist the surgeon, delivery robots to assist the pharmacist or nurse, etc.); they come in a variety of shapes and sizes (humanoid, creature-like, instrumental-like, etc.) and may have a variety of capabilities (e.g., level of robot autonomy, mobility, sensing, natural language processing, facial recognition, etc.). Given the number of robotic options, a framework for their evaluation must be broad enough to capture these differences in a meaningful way.

The CCVSD (van Wynsberghe, 2016, 2015) approach consists of an ethical framework and methodology for the design, implementation, and evaluation of healthcare robots. The framework consists of specific elements or points of reference, taken from a care ethics perspective, to be used in the evaluation of: the practice for which a robot could be used (e.g., bathing, feeding, lifting, etc.); the context in which the robot will be used (e.g., a nursing home, hospital, home setting, etc.); the type of robot intended to be designed or used (e.g., its capabilities, appearance, etc.); and, the care values (also referred to as the moral elements) of a care practice according to care ethicist Tronto (1993, 2010). These care values/moral elements were posited as necessary for the provision of good care and may be considered values that form the buttress for the evaluation of a care practice as either good or bad.

The methods for using the CCVSD framework in a retrospective manner consist of making

descriptions of all the aforementioned elements and ultimately making a comparison between a care practice before the robot has been introduced and after the robot has been introduced. The evaluations are meant to act as a guide to designers and are thus intended to be used in an iterative fashion; designers go back and forth tweaking the robot prototype (and/or approach to implementation) until an acceptable design can be chosen, one that promotes the manifestation of the care values. The methods for using the framework in a prospective manner begin with defining the problem for which a robot may be designed and brainstorming robot prototypes for a robot that could be nested within an existing care practice. This iterative process is meant to evaluate multiple prototypes according to the care values until an ideal solution is reached, that is, one that promotes the care values along with attention for the care receiver and care giver relationship.

### Values

The values explicit and implicit in NAC may best be illustrated in the Dance of Caring Persons (Boykin & Schoenhofer, 2001). The Dance of Caring Persons, a person-centered, caring focused "model for being in relationship" (2001, p. 36) is a visual representation of the fundamental beliefs regarding the meaning of persons and values inherent in the theory of NAC (Figure 1).

Pross, Hilton, Boykin, and Thomas (2011) describe the Dance of Caring Persons as a "relational model that supports a way of being with others that respects and explicitly values each person" (p. 27). The personal knowing of self and commitment to recognizing other as caring person fosters the connectedness of persons and the nature of relating in the Dance of Caring Persons (Purnell, 2017).

Values inherent in the Dance of Caring Persons reflect assumptions underlying the theory of NAC:

- All persons are caring, worthy of respect and have a worthwhile contribution to make to the enterprise;
- Caring is a process that develops over time and is enhanced in relationship with caring others;
- Caring involves the capacity to recognize and respond to that which matters; persons are whole in the moment while simultaneously growing in wholeness or completeness



**Figure 1.** Dance of caring persons.

Source: Boykin, A., & Schoenhofer, S. O. (2001). *Nursing as caring: A model for transforming practice* (p. 37). Sudbury, MA: Jones and Bartlett.

as caring person. (Boykin, Schoenhofer, & Valentine, 2014)

In short, the Dance of Caring Persons is a relational model grounded in values of caring that “expresses the dynamic, fluid, multi-dimensional, multi-directional nature of human relationships and human systems” (p. 35).

In the CCVSD approach, care is not one value but rather a cluster of values that manifest themselves throughout the practice of care. The care values are instrumental insofar as their manifestation results in the promotion of the dignity of those being cared for. From the perspective of CCVSD, the care practice is essentially a response to the needs of another, thus needs mark the starting point for care to begin. The values used for the CCVSD approach are taken from the formulation of a care practice according to political scientist and care ethicist Joan Tronto (1993, 2010), and are: attentiveness, responsibility, competence, and reciprocity. Tronto outlines a care practice in four stages and each has a corresponding moral element. These moral elements are intended to act as the background against which the stage of the care practice can be evaluated. Attentiveness refers to being aware of a patient’s needs while responsibility concerns the moral agency necessary for bearing liability when things go wrong. Competence refers to providing care well and is often linked with the resources available to provide care. Reciprocity concerns the need to monitor the change in the care receiver and to incorporate preferences and intuitions of the person being cared for into the care process. This is also grounded on the belief of patients as individual beings with a life history

and story and that their care is to be unique and particularized just as persons are.

These values, and their realization through care practices, are significant for multiple reasons:

- They center on the relational nature of care, that care giving and care receiving happen as a manifestation of caring for another and/or receiving care from another. In other words, caring is never a process that happens to someone; rather, it is a process that happens with someone.
- They encourage the combination of caring about and caring for patients; the disposition and the action are inextricably linked.
- They are intended to lift the patient from a traditionally passive role into an active role in which their responses and feelings must be included (through the element of reciprocity).

### Value Convergence

Based on the above discussions, broad value convergence between NAC and CCVSD can be identified. These convergences are shown in Table 1.

Uncovering value convergences between the two approaches reveals multiple areas of confluence. In particular, each of these frameworks address the importance of being intentionally and authentically present with those cared for in order to know others as caring and hear calls for caring (Boykin & Schoenhofer, 2001) or recognize needs and engage in appropriate care practices (van Wynsberghe, 2013, 2015). From this starting

**TABLE 1.** Value Convergence Between NAC and CCVSD

NAC	CCVSD
Knowing persons as caring intentional;	Attentiveness—coming to know; Responsibility—commitment to meeting needs
Caring is a process; Persons living caring moment to moment; Direct invitation to share that which matters in the moment	Responsiveness—engaging with care receiver; Care values are expressed between nurse (care giver) and nursed (care receiver)
Caring is enhanced in relationship with caring others; Caring is living in the context of relational responsibilities	Reciprocity—good care requires active participation of the cared for; Ontological status of humans is relational

Note. CCVSD = Care-Centered Value-Sensitive Design; NAC = Nursing as Caring.

point, there are clear moments of value congruence and even convergence. In each approach, there is the recognition of the uniqueness of persons to be cared for and the resolve that individualized care is an essential expression of the dignity of a person. It is in the reciprocal nature of caring that caring happens between persons, not merely to persons. The engagement of nurse and one nursed as described by van Wynsberghe's definition of reciprocity is similar to Boykin and Schoenhofer's concepts of "caring between" and "living caring and growing in caring." This intentional engagement with the other in a care practice (van Wynsberghe) allows the nurse to recognize the dynamic nature of calls for caring and caring responses in the context of nursing situations (Boykin & Schoenhofer, 2001).

### Areas of Divergence

To model a middle range theory that draws on CCVSD and that is congruent with NAC, it is necessary to first account for, and resolve any value tensions or areas of divergence found between the two approaches. Examining areas of value divergence is not intended to emphasize dichotomies as much as to gain a richer meaning and understanding of each of the perspectives and their formulations and use. In the following sections we identify three broad areas and propose the means to reconcile these divergences and find common ground.

*Care versus Caring.* The initial divergence to be recognized and reconciled is in the concepts of "care" (found in van Wynsberghe's work, 2013, 2015) and "caring" (cf. Boykin & Schoenhofer, 2001). Volumes have been written comparing, contrasting, and equating these two terms and we refer the reader to concept analyses of the terms by scholars such as Leininger (1988), Morse,

Solberg, Neander, Bottorff, and Johnson (1990), and Finfgeld-Connett (2008) in nursing, Tronto (1993) in political science, and Reich (1995) in bioethics.

Boykin and Schoenhofer (2001) address caring in a general sense and caring in nursing in a specific sense. In addressing caring qua caring, they draw major understandings from Mayeroff (1971), "caring is helping another grow" (p. 1), and Roach (2002), "caring is the human mode of being" (p. 3). More specifically, caring in nursing is described as "the intentional and authentic presence of the nurse with another who is recognized as person living caring and growing in caring" (p. 13). The Dance of Caring Persons model explicitly values all persons involved in the context of nursing situations.

In contrast, van Wynsberghe's (2013, 2015) point of departure is institutional care practices; linked care activities that "bring together both caring actions with caring dispositions" (p. 22). Thus, care is a series of activities carried out with a certain intention and the focus is on the activities, their manifestation, and evaluation, rather than on an actor, that is, a description of the nurse in his/her role. The nurse is caring insofar as he/she is engaged in a care practice and can meet the needs of the care receiver competently through a care practice. While it is assumed that care givers are valued, their value is crystalized in the form of *how* they provide (good) care. This is to avoid instances in which care givers are valued strictly for their presence when in fact they are not engaged in any concrete actions to help those in need or as is sometimes the case they are present but are abusive or negligent to the care receiver. To be sure, this is not to say that nurses as persons are only valued insofar as they perform their role as care giver; rather, to say that nurses

in their role as care giver are valued specifically in terms of their role in the provision of *good* care. This divergence is interesting when we consider the role a robot will take on in care and/or caring. For van Wynsberghe, the robot becomes nested within a care practice and can perform care insofar as it is an actor engaged in the activity. Thus, the robot is evaluated as an actor in care insofar as it can contribute to the provision of good care rather than for its presence as a care giver in the care practice. In NAC, the possibility exists that robots may enhance caring in nursing situations; for example, through companionable presence, by helping to determine that which matters in the moment, by competently responding to a call for caring and so on.

Context is another aspect of the divergent understandings of care and caring in the two approaches. In the CCVSD approach, the context is care practices, while for NAC, the context is nursing situations. These two contexts differ in that the care practice is a general description of two actors working together to meet needs whereas nursing situations are shared lived experiences in which the caring between nurse or robot as partner-in-caring and one nursed supports living caring and growing in caring.

Van Wynsberghe (2015) describes the connection between care and care practices, with care as a concept, and care practice as contextualized care. The idea of care practice allows for the “marriage between action and disposition” (p. 27) and is defined as “the attitudes, actions and interactions between actors (human and non-human) in a care context that manifests care values: a care practice facilitates the realization of care values” (p. 27). In the CCVSD approach, reiterating and emphasizing the broad notion of care practices is intended to show the prevalence and pervasiveness of care; further, all technologies, such as any version of machine AI including robots, would be nested within care practices.

NAC is a theory of and for nursing, and the context is the nursing situation, characterized as the “shared lived experience in which the caring between nurse and nursed enhances personhood” (Boykin & Schoenhofer, 2001, p. 13). Within the nursing situation, the nurse enters the world of the one nursed in order to know the person as living caring in unique ways and expressing aspirations for growing in caring. The call for caring is heard within the nursing situation, a call to understand that which matters. The nursing situation is also

the context for creating caring responses to calls for caring, responses that nurture personhood.

The authors, in dialogic process, propose that this apparent divergence between caring and care be reconciled by placing a greater emphasis on caring, with explicit attention to moments for co-presence and mutuality. Thus, the robotic partner in nursing must also be evaluated in terms of its impact on the ability to encourage co-presence and mutuality. Further investigations will be required to determine the extent to which a robot can fulfill elements of co-presence and mutuality.

**Need versus Call.** The second area of divergence between NAC and CCVSD that requires attention is the need for care as described by van Wynsberghe (2015) versus the call for caring as described by Boykin and Schoenhofer (2001). More specifically, the critique these authors want to draw attention to is the formulation of “call” as a more egalitarian way to frame the starting point while “need” suggests something of a supplicant to savior relationship essentially reinforcing the asymmetry in power between care giver and care receiver. Gadow (1984) counters what she calls the philanthropic paradigm with the empathic paradigm, in which intersubjectivity is positioned at the center of the caring relationship. The empathic paradigm bridges or transcends the dual isolation of autonomy on one hand and the subject-object isolation on the other with the concept of intersubjectivity.

From the perspective of CCVSD, vulnerability is associated with the existential state of “being in need of care,” as discussed by care ethicist Verkerk (2001). This occurs only when the autonomous individual, understood as the individual capable of making decisions isolated from relationships or responsibilities to others, is put on a pedestal and assumed to carry on throughout life without the need for help from others. In short, to be in need is to be vulnerable, and when one person in a relationship is ascribed the status of needy, asymmetry is unavoidable and mutuality is difficult to maintain. This asymmetry allows for the prevalence of paternalistic forms of care and distances care receivers from active participation in their own care. But CCVSD, in its commitment to care ethics, aims to distance “being in need” from “being vulnerable.”

In Tronto’s (2013) later work, she discusses the concept of “democratic care” and articulates a defining feature of this, the starting point, being a

recognition of the equal status of needs amongst all citizens. This is not to say that all people have the same or even similar needs, “but it is to say that meeting needs is a feature of the life of each and every human, and that each of us is thus engaged in caring from the standpoint of the recipient of care” (p. 29). Thus, humans are all in need at various moments throughout our lives to different degrees and we must therefore rid ourselves of the shame of vulnerability.

Van Wynsberghe’s (2015, 2016) articulation of the CCVSD approach begins from and promotes the perspective of care ethics, in fact the framework is meant to act as the starting point from which one can draw attention to the moral issues and/or tensions through the lens of care ethics. Thus, the use of the term and concept “needs” in combination with the broad conception of care as practices (as discussed above) carries with it the connotation of Verkerk (2001) and Tronto (1993) and insists that although the term ‘need’ is used it is not meant to inspire notions of vulnerability but rather to insist on the omnipresence of needs. Moreover, it is meant to illustrate that good care must be directed at a certain and specific end. This is to ensure that there is a way to evaluate the final care measures but also to ensure that care providers are not providing care for which no need can be found.

From the perspective of NAC, persons are viewed as whole or complete in the moment. The intent of this belief is that persons are always whole and to encounter person means to encounter wholeness. There is no segmenting of person cared for into parts. There is no deficit, no brokenness, no insufficiencies to be “fixed.” From the perspective of NAC, the idea of need is rejected as it implies that there is something lacking in the person that require fixing or fulfilling by the nurse, thus, a diagnosis and treatment approach. Rather, from the perspective of NAC, the nurse when engaged in a nursing situation is focused on intentionally knowing other as caring person, hearing the call for nursing and offering a caring response to that which matters most in the moment. “Calls for nursing are calls for nurturance” (Boykin & Schoenhofer, 2001, p. 14). The nurse responds with personal expressions of caring appropriate to the nursing situation.

*Institutional Privilege versus Dance of Caring Persons.* The last area where one can find divergence that calls for resolution is the privileged position given to the institution as a determiner of value priorities in the CCVSD approach versus

the Dance of Caring Persons approach in NAC. The CCVSD approach was created in the context of guiding the design, introduction, and evaluation of robotic entities for healthcare institutions. NAC was created in the context of a general theory of the discipline and practice of the profession of nursing. Although it is beyond the scope and purpose of this article to delve into the significant body of literature addressing conflictual relationships at the intersection of bureaucratic institutional values and professional values, those troublesome conflicts speak to this particular area of divergence or incongruence between the two frameworks.

The CCVSD approach is situated in the value priority complex appropriate to its intent to be a “user manual” for institutional care practices. Thus, the role that the approach gives to the institution as determiner of value priorities for the design and use of advanced healthcare technologies including intelligent machines is not surprising, and in fact, understandable. For example, in discussing needs as the starting point of the care practice, van Wynsberghe (2015) asserts that “the needs of the institution and the needs of the care providers must come first” (p. 79). This unequivocal privileging of institution and healthcare workers is explained in the sense that healthcare workers and institutions must have the resources needed to meet the needs of the patients. Further,

While this may seem paternalistic at first glance, the entire aim of the CCVSD approach is to shape the care robot according to the values of the institution, an in-depth understanding of the practice and context of use and a commitment to the care ethics tradition. (van Wynsberghe, 2015, p. 84)

Institutional efficiency is “a top value in the healthcare tradition” (p. 95), and the “needs of the care practice (and ultimately the care-giver) must be placed at the fore to ensure that system of the institution efficiently as well as in accordance with the values of the institution” (p. 95).

In the spirit of the Dance of Caring Persons, van Wynsberghe’s presentation of the CCVSD approach contains numerous statements that recognize the importance of input from all those involved in a care practice—the institution, the care providers and the patient. A middle range theory to guide professional nursing practice necessarily must be grounded in a priority complex

congruent with the values of nursing. Therefore, efficiency must be balanced as a value along with effective caring—a focus on hearing calls for caring and responding with expressions of caring that respond directly to that which matters to the one being cared for. From the perspective of NAC, efficiency can certainly be an aspect of the value complex, though not a first tier value.

### **Toward a Middle Range Theory for Integrating Robotic Partners in Nurse Caring**

A middle range theory grounded in the values and concepts of NAC is sought that has promise for guiding the integration of robots as partners in caring in nursing situations. van Wynsberghe's CCVSD approach offers concepts and structure that contribute to that promise.

The Dance of Living Caring (Figure 2) is presented as a model that brings key elements of the CCVSD approach together with NAC theory in a way that enriches a purposeful middle range theory of nursing practice with robots. In recognition of the prospect of robots as partners in caring in the practice of nursing, the language of The Dance of Caring Persons has been modified. The term, Dance of Living Caring, reflects a key element of the focus of nursing from the perspective of NAC: nursing is nurturing persons living caring and growing in caring. (In this modification, the idea of "growing in caring" is not intended to be minimized as an important element of the focus of nursing but is subsumed in the concept of "living caring," understood as an aspect of what it means to "live caring"). The Dance of Living Caring looks to the future, expanding the potential for meaningful contributors to the nursing partnership, entertaining the possibility that those future partners in caring may be robots, androids, and even humanoids (Locsin et al., 2018).

In Figure 3 we have provided a more detailed account of the relationship between the two approaches (NAC and CCVSD) to arrive at the middle range theory, connecting the key points of resonance between NAC and CCVSD.

The Dance of Living Caring, intended to suggest the key concepts and their structural interrelationships, reflects the Dance of Caring Persons and its foundational general theory of NAC (Boykin & Schoenhofer, 2001), as influenced by van Wynsberghe's (2015) CCVSD approach to designing, implementing, and evaluating care robots. The envisioned goal of this collaborative

work is a middle range theory to guide selection and implementation of robots as partners in caring in nursing situations. The Dance of Living Caring locates decisions about whether and how to introduce robots into healthcare situations in "the dance" rather than privileging any one stakeholder, an egalitarian ethic that is central to The Dance of Caring Persons and frequently echoed in the CCVSD approach as well.

The second concept in the model, respecting and valuing persons as caring, directly echoes the CCVSD approach concept of "commitment to reciprocal engaging" and to NAC's "caring is relational." The Dance of Caring Persons, of which this new model is an adaptation, is described as a relational model. The "caring between" is a central concept in the NAC theory, and is the relation that makes nursing possible. To reiterate, the focus of nursing, as stated in NAC, is "nurturing persons living caring and growing in caring" (Boykin & Schoenhofer, 2001, p. 11). Further, the nurse is said to "enter into the world of the other in order to know the other as caring and to affirm, support—to ensure that care happens with them rather than to them—and to ensure that this role is valued in the very evaluation of good care. By emphasizing the responsiveness of care receivers the aim is also to encourage the focus of care givers not on their own preconceptions of what ought to be done but on engaging with the care receiver to identify and reflect together. In this way, the relationship between care giver and care receiver is made central and the process of care is strengthened rather than reducing care to a set of isolated or unconnected tasks.

Hearing and responding to calls for caring is the third concept in the model. In NAC, this is what nurses "do." Nursing is about caring—caring in ways that matter to the one nursed. A middle range theory grounded in NAC, intended to guide nursing situations involving robots as partners in nurse caring, would necessarily address hearing and responding to calls for caring. We have shown that the concept of "needs" as traditionally conceptualized is not congruent with NAC and it is not necessary to a model of a middle range theory for nursing based on the Dance of Living Caring. Given the purpose of this evolving model, the concept of "calls for caring" offers guidance about function to designers of robots, and also provides institutional guidance for implementation of robots as care partners.



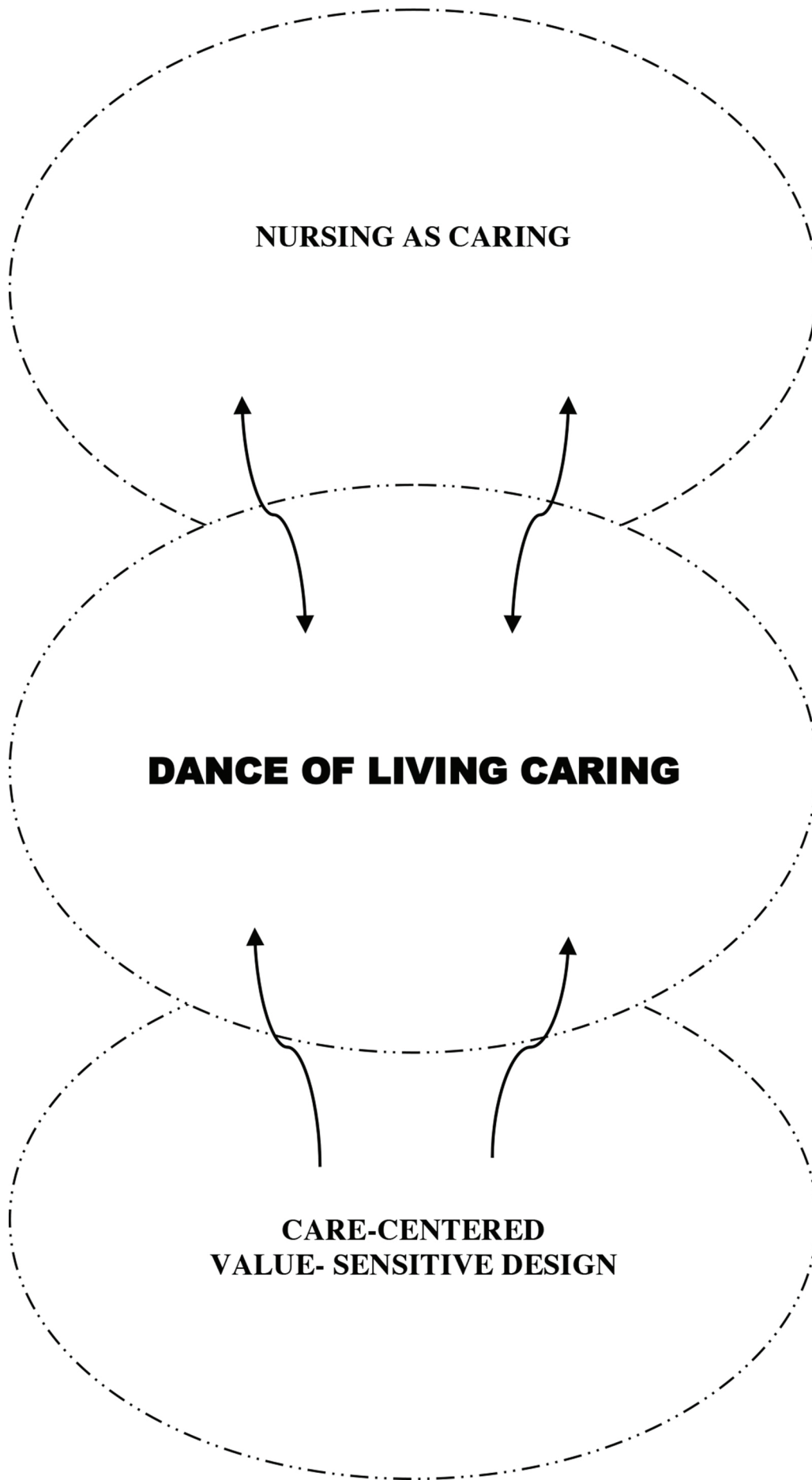
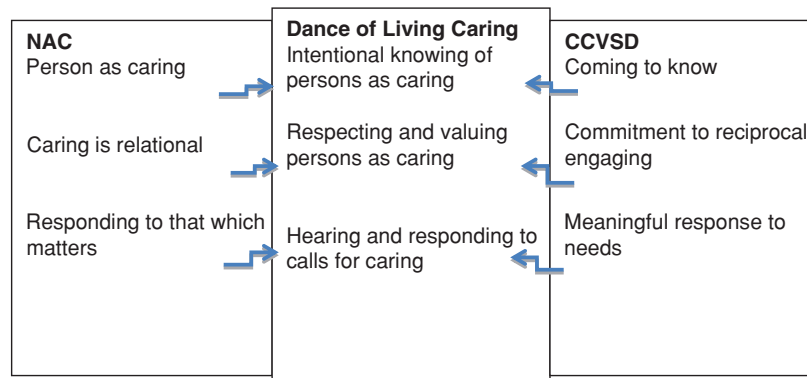


Figure 2. Dance of living caring.



**Figure 3.** The dance of living caring.

### Conclusion

We set out to propose a model that could lead to the development of a middle range theory to guide the engagement of robots as partners in caring in nursing situations. The model presented is an integration of NAC and CCSVD, based on areas of convergence, with areas of divergence resolved. Further developmental work will include spelling out a middle range theory based on the Dance of Living Caring model, and testing the theory using various modes of inquiry, including philosophical analysis, research, and pilot-testing. The model itself should be disseminated to nursing and healthcare policy groups in an effort to influence the adoption of caring and care values as central elements in standard-setting for the engagement of care robots in nursing and healthcare. The model could also be an important aspect of curriculum design addressing the use of advanced technology in nursing. While it is beyond the scope of this article to offer specific guidance for nursing practice with robots as partners in caring, we believe it is important to lay the groundwork for a middle range theory that can guide future nursing practice involving robots as partners.

In conclusion, robots are being introduced into nursing environments and it is imperative that nursing professionals have the tools to insure that the participation of robots in nursing situations be explicitly grounded in the central service of nursing—caring.

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