

Viewing Assignment of Moral Status to Service Robots from the Theological Ethics of Paul Tillich: Some Hard Questions

Theodore Metzler

Wimberly School of Religion, Oklahoma City University
2501 N. Blackwelder
Oklahoma City, OK 73106-1493
tmetzler@okcu.edu

Abstract

This paper initially addresses the possibility that expanding human-robot interaction (HRI) – particularly HRI involving humanoid service robots – may increasingly encourage *de facto* assignment of some measures of moral status to such artifacts. Finding reasons to believe that emergence of a social phenomenon of this kind is plausible, it then examines such assignment from the perspective of a specific example of contemporary Christian theology – viz., the theological ethics of Paul Tillich. Results of the examination raise questions strongly encouraging continued multidisciplinary attention to implications of expanding HRI wherever understandings of morality resembling those of Tillich are meaningful.

Introduction

Although moral implications of HRI involving industrial and military robots may merit attention as well, the class of *service robots* will receive focal consideration in this paper. Much of the motivation for this focus concerns the fairly recent appearance of robots in this class that especially display so-called “humanoid” properties. Robots such as Honda’s ASIMO resemble human beings both in physical appearance and behavior, visually interpreting and responding to our speech and our gestures in recognizably human-like ways. These features are significant for the purposes of this paper because they notably are encouraging people to respond to the robots as “companions” more readily than as appliances or tools.

Development, production, and marketing of such artifacts do not appear to be phenomena that have occurred – roughly, during the opening years of this century – as any inevitable result of so-called “technological determinism.” Indeed, as recently as the year 2000, Patrick Harbron introduced a prescient article in *DISCOVER* magazine with the following observations:

When it comes to having a robot around the house, humans don’t seem willing to settle for the simple solution: a mechanized box on wheels. Instead, we appear to be obsessed with having the device resemble us as much as possible. And not just in looks but in the way it talks, walks, thinks, and feels.

Just how far should we take this? How human should a humanoid robot be? ...

Artificial intelligence (AI) pioneer John McCarthy was among the first of the impressive panel assembled in Harbron’s article to respond to his question – and McCarthy’s response immediately brings to mind the concept of such humanoid artifacts enjoying some degree of moral status:

In my opinion, the robots need to be designed so that they will be regarded as appliances rather than as people. We don’t want robots that people will hate or fall in love with or anything like that. We have enough trouble treating other people decently without inventing a new oppressed minority.

Regardless of how literally McCarthy intended us to read his concern for “a new oppressed minority,” robotic appliances that are designed to resemble cake pans and are marketed as vacuum cleaners most likely never will become objects of such worries; adding features that make the devices strongly resemble *human housekeepers*, however, might *have* that effect. Precisely that technical possibility was also in the mind of Marvin Minsky, another noted AI pioneer on Harbron’s panel. Minsky voiced concerns resembling those of McCarthy in the following observation:

The new point to me is the idea that we don’t want people to learn to order around servants that look like people, because that’s catching. If you tell a household robot to do unspeakable, disgusting, or just boring things, you’ll get the hang of telling other people to.

Minsky’s insight, in this comment, recognizes an important phenomenon that counts among the motivations for the present paper – viz., the *effects upon humans* of their interactions with humanoid service robots.

In addition to interest in these human implications, the present paper is motivated by evidence that the robotic possibilities mentioned by McCarthy and Minsky already are being dramatically *actualized* – as well as by reasons to believe that their continued growth may be expected in the relatively near future. Writing for *National Geographic News* in 2006, for example, Stefan Lovgren reports that South Korea is developing robots that should be capable of doing “everything from guiding museum visitors to

teaching school children English” (Lovgren 2006). In fact, Lovgren immediately adds that the South Korean government “wants to see mass production of networked robots begin next year and hopes to put a robot in every household by 2020.” Oh Sang Rok (a South Korean official in charge of a project comprising thirty companies and approximately one thousand scientists) also is quoted in the report by Lovgren, expressing a broad commercial view that suggests Oh’s enterprise is likely to continue growing: “The market size of industrial robots is almost saturated worldwide ... but the market of service robots is only now opening.” How does that market assessment look to the world’s richest man? Bill Gates is quoted in the Spring 2007 issue of *AI Magazine* (citing his prior remarks in *Scientific American*) with the opinion that the industrial robots “used on automobile assembly lines” should be thought of as “yesterday’s mainframes” (Glick). Mentioning several development challenges that happen also to be critical for the newer class of humanoid robots we are discussing, Gates continues his assessment in the following terms:

[S]ome of the world’s best minds are trying to solve the toughest problems of robotics, such as visual recognition, navigation and machine learning. And they are succeeding. ... I can envision a future in which robotic devices will become a nearly ubiquitous part of our day-to-day lives.

It is to be granted that countries such as South Korea and Japan may currently still be in relatively early stages of making human interaction with humanoid robots part of the common experience that Gates envisions – and much of the general public in the United States may still be largely unaware of the technology. (Indeed, when I directed my students in an online course last year to visit web sites displaying artifacts such as Honda’s ASIMO, their expressions of surprise in the resulting discussions were often quite striking.) Nevertheless, the phenomenon of central concern in this paper – HRI involving humanoid service robots – is no longer one that responsibly can be dismissed simply as imaginative science fiction speculation; it already is real, and its currently rapid growth may be expected to continue.

Accordingly, the following sections successively will address the following topics concerning this phenomenon:

- evidence that the subject class of robotic devices can be expected to receive growing *de facto* social acceptance as entities with some measure of moral status,
- a review of the structure of Paul Tillich’s theological ethics, and
- formulation of some difficult questions that apparently emerge when one *views* the anticipated moral acceptance of the robotic devices *from the perspective* of people who live with conceptions of morality resembling those of Tillich.

Plausible Acceptance of Humanoid Robots as Moral Agents

Intuitively, it is not difficult to affirm the following observation recorded by MIT researcher, Sherry Turkle:

When a robotic creature makes eye contact, follows your gaze, and gestures toward you, you are provoked to respond to that creature as a sentient and even caring other. (Turkle 25)

To that extent, one immediately can appreciate the possibility that human-like service robots eventually could be accepted as entities to whom we may owe certain moral obligations (and possibly even as entities capable of assuming some measure of moral responsibility). That is to say, the phenomenon of human ascription of moral *status* to such artifacts enjoys at least *prima facie* plausibility.

In view of the relatively recent appearance of robotic creatures displaying convincingly life-like appearance and behavior, however, it should not be surprising that empirical study of this phenomenon still appears to be proceeding at an early stage of development. Studies concerning human interaction with Sony’s robotic dog AIBO, for example, generally have yielded ambivalent evidence of the artifact gaining moral status (Kahn 2004; Melson 2005). More recently, though, Gail Melson and her colleagues have reported work supporting, *inter alia*, “the view that embodied social robots like AIBO may give rise to new ontological categories, artifacts that appear to think and feel, can be friends and at least potentially lay some moral claims for kind, fair and just treatment” (Melson 2006, 39). Among the quantitative details included in this 2006 report by Melson, et al, the following is representative:

Finally, there was an interesting pattern, whereby children perceived that AIBO has moral standing (63% preschoolers, 76% older children) but adult AIBO owners, at least in their discussion forum postings, did not (12%). (Melson 2006, 39)

Although empirical scientific study of HRI with robotic dogs has yielded evidence both supporting and questioning human attribution of moral status (at least to the general class of artifacts that includes humanoid service robots), other kinds of human responses also deserve to be considered.

Roboticians, for example, generally appear to be disposed (perhaps predictably) to anticipate confidently the ultimate elevation of their artifacts to moral status. I previously have compared characteristic views of this technical community with those typical of religious communities (Metzler 2006), while acknowledging that individuals may, of course, belong to both communities; the present paper focuses upon a specific subset of the latter community. Sherry Turkle, who has interacted extensively with MIT’s distinguished artificial intelligence and robotics researchers

(Rodney Brooks, Cynthia Breazeal, Marvin Minsky, etc.), also has noted the tendency of this community to “argue the moral equivalence of robots as a companion species” (Turkle 28).

Beyond the understandable confidence of the robotics community, however, there also appears to be some evidence that the first steps toward social assignment of moral status to robotic devices *already are in progress*. Previously, we have noted that South Korea – described by Stefan Lovgren as “the most wired country in the world” (Lovgren 2006) – is moving rapidly toward extensive HRI involving humanoid service robots. In that context, one finds Dylan Evans reporting the following for BBC News on March 9, 2007:

This week, experts in South Korea said they were drawing up an ethical code to prevent humans abusing robots, and vice versa.

Although Evans notes that prudential concerns regarding safety are an important part of this initiative, he adds comments that betray the progression of thinking that apparently is occurring:

Robot vacuum cleaners and lawn mowers are already in many homes, and robotic toys are increasingly popular with children. As these robots become more intelligent, it will become harder to decide who is responsible if they injure someone. Is the designer to *blame*, or the user, or *the robot itself*? [emphasis added]

If mention of the so-called “slippery slope” metaphor may be excused, we appear to have good reasons to anticipate that the real and expanding phenomenon of HRI involving humanoid service robots is likely to be accompanied by their progressive *de facto* social acceptance as entities with some measure of moral status. To appreciate how this phenomenon might be viewed by a significant part of the Christian religious community, we shall now turn to a review of the theological ethics of Paul Tillich.

Overview of Paul Tillich’s Theological Ethics

The objective of this section is to furnish a fairly concise review of the account of ethics that theologian Paul Tillich (1886-1965) presents in the first three chapters of *Morality and Beyond*. The review will emphasize aspects of his account that seem particularly pertinent to the intended application topic, and it is meant to facilitate the subsequent discussion of questions that his thinking raises. Some details of Tillich’s work that are not included in the review will be introduced at appropriate points in the discussion that follows it.

Inasmuch as the present paper is intentionally a multidisciplinary exercise, some of its “technical” readers may be generally unfamiliar with Christian theology – and particularly unfamiliar with the background of Paul Tillich. Hence, some brief biographical comments may be in order

at the outset. Paul Tillich was born as the son of a Lutheran pastor in eastern Germany, and, in fact, was ordained in the Evangelical Lutheran church when he completed his philosophical and theological education. Although he served as an army chaplain in World War I and subsequently undertook teaching of philosophy and theology in several German cities, he found Hitler’s rise to power unacceptable and emigrated to the United States. His distinguished career in this country included teaching at Union Theological Seminary, Harvard Divinity School, and the Divinity School of the University of Chicago. Philosophically, he was primarily influenced by existentialism. The edition of his three-volume magnum opus, *Systematic Theology* (also to be referenced in this paper) characterizes Tillich as “a leading theologian of our age.”

Almost immediately in his Introduction to *Morality and Beyond*, Tillich presents a view holding substantial significance for the purposes of this paper. Specifically, he announces that “religious principles dwell within the principles of moral action” (15). The potential difficulty that this strong coupling of religion and ethics may pose for attribution of moral status to a machine should be obvious at once, although we shall delay discussion of the point until later.

From this opening declaration, one readily might infer that Tillich wishes simply to construe something such as the Ten Commandments or the Sermon on the Mount as prescription for our moral behavior that bears the unconditional authority of divine will. One might think, as Tillich himself rhetorically suggests, that moral commands “are religious because they are divine commandments,” or perhaps “are ultimately serious because they express the ‘Will of God’” (23). Familiar language of this kind, however, effectively could mask Tillich’s actual message. His more subtle meaning involves an existentialist notion of human becoming, as he explains in explicit qualifying remarks:

I maintain ... that the term “Will of God” can and must be understood differently. It is not an external will imposed upon us, an arbitrary law laid down by a heavenly tyrant, who is strange to our essential nature and therefore whom we resist justifiably from the point of view of our nature. The “Will of God” for us is precisely our essential being with all its potentialities, our created nature declared as “very good” by God ... (24)

In effect, Tillich is asserting that our free moral acts are not properly understood as choices to obey some alien and external command, but, rather, as choices to *become* what we already *are* - internally, essentially, and *potentially*. We *actualize* our real *potential*, not in response to “a strange law that demands our obedience,” but, rather, in moral acts responding to “the ‘silent voice’ of our own nature ...” (24). And what, exactly, is this potential that we may choose to actualize? Tillich answers: “The moral

imperative is the command to become what one potentially is, a *person* within a community of persons” (19). What then, for Tillich, makes this moral imperative a specifically *religious* imperative? He answers that “the religious dimension of the moral imperative is its unconditional character” (22). The moral imperative to become a person within a community of persons is *unconditional* (or “categorical,” in the terminology of Immanuel Kant) because it is grounded in the reality of our being. If it were merely “hypothetical” – i.e., if the imperative served some separate and additional aim – then we should be proceeding directly toward a swamp of “normless relativism” that Tillich wishes to avoid (14). On the other hand, if the imperative were imposed by some alien and external source then we would be trapped in a “graceless moralism” that Tillich also wishes to avoid (14). Tillich’s “main proposition” in Chapter I, then, is that “there is a religious dimension in the moral imperative itself,” where the fundamental concept of *religion* is to be understood as “the state of being grasped by an ultimate concern ... by something one takes unconditionally seriously” (30). (No, Dorothy, we are no longer on the familiar landscape of secular consequentialist ethics.)

At this point, the reader might well have an uncomfortable feeling that Tillich already has replaced thought about common moral codes (e.g., “Thou shalt not steal”) with esoteric language concerning forbidding abstractions (e.g., actualizing the potential of one’s essential nature) – and Tillich anticipates this possibility. He begins Chapter II immediately acknowledging “the answer – that we must become what we essentially are, *persons* – is so formal that it does not offer any concrete advice” (31). Tillich proceeds to address this concern with some review of historical precedents (e.g., natural moral law doctrines of the Catholic church and Protestant appeals to the authority of scripture), explaining what he takes to be their respective deficiencies. He also recognizes “Contemporary ethical theory has strongly emphasized the person-to-person encounter as the experiential root of morality” (36). And, in fact, Tillich expands on this latter point in ways that we presently shall wish to examine, in applying his thinking to the phenomenon of assigning moral status to machines. For the immediate purposes of expository review, however, it will be sufficient to observe that Tillich’s response to the call for concrete moral advice, in Chapter II, rests upon an appeal to the concept of unconditional love (*agape*) that was characterized so elegantly by the Apostle Paul in I Corinthians 13:

For *agape* transcends the finite possibilities of man. Paul indicates this in his great hymn to love ... when he describes *agape* as the highest work of the divine Spirit, and as an element of the eternal life, even beyond faith and hope. (40)

With this appeal, Tillich does not reject the usefulness of ordinary moral codes; rather, in the manner of Jesus, he

urges that their specific applications be guided by unconditional love:

A considerable amount of moral habit is necessary in order to fulfill the demands of an average existence. Therefore, the tables of laws ... are gifts of grace, although they can become destructive when elevated to absolute validity and substituted for *agape* and its power to listen to the voice of the “now.” (45)

Tillich, of course, is by no means the first voice in a venerable historical record of moral thought to announce the insufficiency of symbolically represented instructions as guides for authentic moral behavior – and he *does* make this announcement explicitly:

Tables of laws can never wholly apply to the unique situation. This is true of the Ten Commandments as well as of the demands of the Sermon on the Mount and the moral prescriptions in the Epistles of Paul. “The letter kills” not only because it judges him who cannot fulfill the law, but because it suppresses the creative potentialities of the unique moment which never was before and never will come again. (43)

In any case, Tillich’s account of theological ethics clearly requires that the genuine moral agent be capable of experiencing unconditional love.

Although *agape*, for Tillich, may be the *necessary* resource, in concrete situations, for answering the moral question “What ought I do?” it does not immediately follow that *agape* also is a *sufficient* resource for answering “Why should I do it?” That is to say, Tillich recognizes (and addresses, in Chapter III) an important remaining problem of accounting for moral *motivation*. The notion of motivation to perform acts that we already know to be morally good logically implies, of course, some sense that we are imperfect creatures. As Tillich puts it, “the moral law is experienced as law only because man is estranged from the structural law of his essential being ...” (48). Historically, Christian theology has returned repeatedly to the notion of divine “grace” as the essential resolution for this estrangement – and Tillich (as his Lutheran roots might suggest) is no exception. Referring to the examples of the Apostle Paul, St. Augustine, and Martin Luther, he records the following observation:

They took the moral imperative without compromise and without self-deception, and concluded that the “naked” moral law has no motivating power. They looked for something that had this power, and they found it in the religious element which they called “grace,” a word that requires much interpretation to become an answer also for us. (56)

As he delivers the promised “interpretation,” Tillich is led to the Platonic concept of *eros* (treated, for example, in Plato’s *Symposium*). Characterizing *eros* as “the transmoral motivation for moral action,” he adds that it “can also be described as being grasped by that toward which *eros* drives” (59). Significantly, the interpretation for “grace” that Tillich proceeds to develop, using *eros*,

retains the typically Christian notion that it is *a gift from deity* – i.e., as Tillich says, “It cannot be produced at will” (61). Accordingly, Tillich’s own succinct summary of his account of theological ethics, at the conclusion of his third chapter, takes the following form:

The unconditional character of the moral imperative, love as the ultimate source of the moral commands, and grace as the power of moral motivation are the concepts through which the question of the relation of religion and morality is fundamentally answered. (64)

At this point, the foregoing review and explication of Tillich’s moral thinking should prove useful as we begin to consider, *from its perspective*, the prospect of assigning moral status to humanoid service robots.

Questions Raised from the Perspective of Tillich’s Theological Ethics

The questions to be articulated in the following discussion are not labeled “hard” questions in the title of this paper with any presumption that they will be perceived as such by everyone. We live in a big world. To members of many human communities they may well appear to be unimportant, or even pointless. This paper is motivated, however, by a belief that we *are* approaching times in which serious dialogue between *some* groups of people will be urgently needed to resolve differences highlighted by the questions. The discussion also does not aim to critique or applaud any of the communities that it involves – rather, it modestly is intended to facilitate some responsible communication among them.

For those communities in which at least the main outlines of the Tillichian account of morality happen to be meaningful, an obvious first question is implied when we compare anticipated attributions of moral status to humanoid service robots *with* the proposition that morality is inextricably a *religious* topic. At least until all human cultures are satisfied that they have reached “post-religious” status, some adjustments evidently will be needed to accommodate these novel artifacts in (what Tillich describes as) a community of persons. In any case, the perspective of Tillich’s theological ethics does not allow us to have it both ways – should the artifacts count as persons in community, or ought they be rejected as *bona fide* moral agents?

Fortunately, at least one theologian who is thoroughly familiar with Tillich’s work has undertaken some of the fresh thinking that is demanded by this first question. Referring to “Kismet,” an early representative of the new research area known as “social robotics,” Anne Foerst offers the following suggestions near the conclusion of her (appropriately named) book, *God in the Machine: What Robots Teach Us About Humanity and God*:

Hence, humanoid robots such as Kismet will become a definite part of the community of persons. If they don’t, it means that we will also exclude human beings. Discussing the question of Kismet’s personhood can therefore be used as a corrective that helps us to test our own myths of personhood for their inclusivity. ... (189)

Indeed, Anne’s recommendations have authentic Tillichian roots. Of course, Paul Tillich only lived through the first nine years of the period in which, arguably, “artificial intelligence” research was so named; accordingly, he can hardly be expected to have anticipated the novel problems we are addressing. Nevertheless, some of his comments in Chapter II of *Morality and Beyond* are especially pertinent to Anne’s suggestions, and we can now redeem an earlier promise to consider them in somewhat more detail.

Following a previously-mentioned observation that contemporary ethical theory “has strongly emphasized the person-to-person encounter as the experiential root of morality,” Tillich refers to “the basic difference between the encounter of a person with another person and his encounter with nonpersonal realities” (36). (At this point, he acknowledges, also, the relevance to the discussion of Martin Buber’s celebrated I-Thou/I-It distinctions.) In this context, Tillich notes that our behavior becomes more limited in the case of “ego-thou” encounter, and the reason for the limitation is, precisely, “the other person” (37). However, he immediately adds that “it is not so simple when we ask: where do we encounter a person?” That certainly is the question raised by the advent of convincingly humanoid service robots, and – like Foerst – Tillich proceeds to call attention to lapses in our “inclusivity” involving other *humans*: “Slaves, women, enemies, and special races were considered as objects with limited or unacknowledged humanity” (37). Perhaps *manufactured artifacts* resembling ASIMO eventually *will* be added to this list of wrongful exclusions; whether they *ought* to be added, though, may yet depend upon whether their gross appearance and behavior really are adequate criteria for approving the suggested analogy.

It may be pertinent to this question that Tillich does raise elsewhere in his works – specifically, in Volume III of his *Systematic Theology* – some observations that may recommend *caution* in attributing moral status to machines. He begins by distinguishing the concept of “self” from the notion of a “thing,” and proceeds to note the following regarding “man’s” production of *things*:

His self becomes a thing by virtue of producing and directing mere things, and the more reality is transformed in the technical act into a bundle of things, the more the transforming subject himself is transformed. He becomes a part of the technical product and loses his character as an independent self. (74)

Indeed, I similarly have cautioned (Metzler 21) that – for *some people* – strong HRI with advanced humanoid robots

could, by encouraging them to *view themselves* as machines, erode their self-perceptions as moral agents (“Don’t blame me – I’m just a robot.”).

Even among those members of so-called “technical” communities who already cheerfully *do* regard themselves as machines, Tillich’s theological ethics – if correct – may pose some hard questions. Attention was directed, previously in this paper, to a recent *BBC News* report of South Korean “experts” who were “drawing up an ethical code” in anticipation of impending growth, in that country, of HRI involving advanced service robots (Evans 2007). Reporting the same event for *National Geographic News*, Stefan Lovgren adds the following details:

The so-called Robot Ethics Charter will cover standards for robotics users and manufacturers, as well as *guidelines on ethical standards to be programmed into robots*, South Korea’s Ministry of Commerce, Industry and Energy announced last week. [emphasis added] (Lovgren 2007)

Lovgren’s description of what needs to be done apparently reflects a common perception of how advanced robots might be prepared to display appropriate moral behavior – “program” them with “guidelines on ethical standards.” Even if we allow more generous and technically realistic assumptions that the actual software would need to be substantially more sophisticated, perhaps including such features as machine learning capability, Tillich’s account of ethics raises at least the possibility that such effort is Quixotic. At best, the critical role for *agape* that we already have seen Tillich call for (as a guidance for application of moral principles) should pose some challenges – if Tillich is correct – for software engineers. “Programming,” “training,” or “evolving” *unlimited love* into a machine could prove to be a formidable functional requirement.

Finally - and, again, *if* Tillich is right – it should seem that the real success of any robotic device *as* a genuine moral agent could critically depend upon provision of divine *grace!* (Walking the waterfront seven years ago in Newburyport, Massachusetts, I asked myself “*Will* Jesus love the little robots?”)

Conclusions

Wherever understandings of morality resembling those of Paul Tillich are meaningful, expansion of HRI involving humanoid service robots is likely to demand answers to a number of challenging questions implied by his thinking. In view of the apparently accelerating pace of development in robotic technology, continued multidisciplinary attention is recommended strongly at this time for questions of the kind suggested in this paper.

References

- Evans, D. 2007. “The ethical dilemmas of robotics.” *BBC News*. 9 March 2007. 2 April, 2007.
<<http://news.bbc.co.uk/2/hi/technology/6432307.stm>>
- Foerst, A. 2004. *God in the Machine: What Robots Teach Us About Humanity and God*. New York: Dutton.
- Glick, J. 2007. “AI in the news.” *AI Magazine* 28.1 : 96.
- Harbron, P. 2000, “The Future of Humanoid Robots.” *DISCOVER Magazine*, 1 March, 2000. 8 March, 2007.
<<http://discovermagazine.com/2000/mar/featfuture>>
- Kahn, P. Jr., N. Freier, B. Friedman, R. Severson, and E. Feldman. 2004. “Social and Moral Relationships with Robotic Others?” *Proceedings of the 2004 IEEE International Workshop on Robot and Human Interactive Communication*. 545-50.
- Lovgren, S. 2006. “A Robot in Every Home by 2020, South Korea Says.” *National Geographic News* 6 September, 2006. 2 April, 2007.
<<http://news.nationalgeographic.com/news/2006/09/060906-robots.html>>
- Lovgren, S. 2007. “Robot Code of Ethics to Prevent Android Abuse, Protect Humans.” *National Geographic News* 16 March, 2007. 2 April, 2007.
<<http://news.nationalgeographic.com/news/2007/03/070316-robot-ethics.html>>
- Melson, G., P. Kahn, Jr., A. Beck, B. Friedman, T. Roberts, and E. Garrett. 2005. “Robots as Dogs?” – Children’s Interactions with the Robotic Dog AIBO and a Live Australian Shepherd.” *CHI 2005*. ACM : 1649-52.
- Melson, G., P. Kahn, Jr., A. Beck, and B. Friedman. 2006. “Toward Understanding Children’s and Adults’ Encounters with Social Robots.” *Technical Report WS-06-09*. AAAI Press, 2006: 36-42.
- Metzler, T. 2006. “Potential Impacts of HRI upon Different Understandings of Morality.” *Technical Report WS-06-09*. AAAI Press, 2006:15-22.
- Tillich, P. 1995. *Morality and Beyond*. Louisville, KY: Westminster John Knox Press.
- Tillich, P. 1971. *Systematic Theology*. Chicago: The University of Chicago Press.
- Turkle, Sherry. 2004. “Whither Psychoanalysis in Computer Culture?” *Psychoanalytic Psychology*, 21:1, pp. 16-30.