



Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:

<https://eprints.whiterose.ac.uk/id/eprint/107511/>

Version: Accepted Version

---

**Proceedings Paper:**

Prescott, T.J. (2013) Sunny uplands or slippery slopes? The risks and benefits of using robots in care. In: Proceedings of UKRE Workshop on Robot Ethics. UKRE Workshop on Robot Ethics, 25 Mar 2013, Sheffield, UK. University of Sheffield.

---

**Reuse**

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.

# Sunny uplands or slippery slopes? The risks and benefits of using robots in care

Tony J. Prescott<sup>†\*</sup>

<sup>†</sup> Sheffield Centre for Robotics, University of Sheffield, t.j.prescott@sheffield.ac.uk

\* Corresponding author

**Abstract:** This paper considers some of the ethical issues around the use of robots in caring for older people and in childcare. I argue that the debate on the use of robots in care has involved slippery slope arguments for which the likelihood of progression to worst-case outcomes needs more thorough analysis. In older care, the risk of social isolation of older people through use of care robots is indirect and may have been overstated; similarly, in childcare, the risk of psychological damage to children, through irresponsible use of robots, must be balanced against the potential positive benefits of these technologies if used appropriately.

**Keywords:** Robot ethics, childcare, care of older people.

A recent Eurobarometer survey [1] of public attitudes to robotics found that 60% of the people polled agreed that robots “should be banned” from use in the “care of children, elderly and the disabled”. This rather surprising statistic indicates a high level of concern about the use of robots in care that contrasts with the generally neutral views towards robots in other roles found in that same survey (for instance, only 7% of respondents thought that military uses of robots should be banned). In the field of robot ethics, the use of robots in care has also been singled out as a specifically high-risk domain, with authors such as Sparrow & Sparrow [2] arguing that the use of robots in care is intrinsically unethical, and Sharkey & Sharkey [3] arguing that exposing children to carebots could result in psychological damage.

Given the pressing need to improve societal provision of social care—particularly, for the increasing numbers of older people in Europe—what makes the use of robots in care so high risk? A key concern, highlighted by both Sparrow & Sparrow and Sharkey & Sharkey are scenarios in which the use of robots accelerates beyond machines taking over from people in some limited aspects of care—or working alongside human carers—to vulnerable people being left almost exclusively in the care of robots. Whilst it is important to consider such worst-case outcomes, that such scenarios can be envisaged does not mean that they are inevitable or, indeed, likely. Here I argue that to properly evaluate these risks a more thorough analysis is needed of the steps that would have to take place in order for these worst case outcomes to be realised, of their likelihood, and of the societal costs of *not* developing care robots in future care contexts that will be significantly impacted by the demographic shift.

## The logic of slippery slopes

In ethics, those arguing against a particular course of action on the basis of a potential worst-case outcome, often employ a form of argument known as the “slippery slope”. The general form, which is familiar to most, is to argue that an action that may in itself seem harmless, will establish a trajectory that, with high probability, leads to an unintended and unethical final outcome. Slippery slope arguments can be valid but only if their proponents can establish a clear causal chain, also known as the *warrant*, whereby the initial action, via a series of predictable knock-on effects, results in the envisioned worst-case result. The problem with such arguments is that often this causal chain is not adequately justified, or, that the links along the chain have some probability less than one and that therefore the cumulative likelihood of the worst case is actually much lower than supposed. For instance, if a tree falling over in a forest has some high probability of knocking down one neighbouring tree, say 90%, then it might be supposed that one tree falling will eventually flatten a large area of forest. However, even though the probability of each step might be high, the cumulative probability of the worst case (the largely flattened forest) is really very low. Indeed, mathematically the expected number of fallen trees is just ten in this scenario.

The contention of this paper is that ethicists have presented slippery slope arguments against the use of robots in care, but have not adequately established the likelihood of these trajectories. In considering worst case outcomes it is important to give due consideration not just to the circumstances that could give to these dystopian scenarios but also to the *defeaters* that can prevent slippery slope outcomes.

### Robots and fears of social isolation in older people

I will briefly illustrate this view with reference to Sparrow & Sparrow's [2] critique of the use of robots in caring for older people. In their paper "In the hands of machines? The future of aged care", the authors present a slippery slope argument based on the proposition that the use of robots in care will bring about a reduction in human-human contact for older people. The same argument, expressed several times in their paper, is summarised clearly in the following: "It is likely that success in introducing robots into the aged-care sector will be at the expense of the amount of human engagement available to frail aged persons. We have highlighted the importance of social contact and both verbal and non-verbal communication to the welfare of older people. Any reduction of what is often already minimal human contact would, in our view, be indefensible. It is our view that handing over cleaning and other household tasks to Robocare, Rosie, Yumel, Wakamaru, or Mentorbot—or their equivalent—would therefore most likely be detrimental to the well-being of frail older people." ([2], p. 152)

This position stands as a slippery slope argument because the objection is not to the initial step of automating some aspect of older care such as help with household tasks, rather, to a predicted consequence of the introduction of such home-help robots, that there will be a significant reduction in human-human contact. The warrant for this argument is that the economic benefit to care-providers of replacing human carers with robots means that people will be pushed out of caring roles by cheaper, but socially ineffective, care robots. Although there is some intuitive plausibility to these scenarios it is useful to identify some of the requirements that must be met in order for this outcome to be realised. The following is intended as an illustrative, rather than complete, list:

- (i) Robots will need to be sufficiently autonomous as to not require the supervision of human care staff.
- (ii) The use of robots will not lead to more effective deployment of human care that compensates any reduction in the number of human carers.
- (iii) Older people themselves will take no significant action to compensate for any loss in social contact due to the introduction of care robots.
- (iv) Governments, companies, charities, and other bodies responsible for social care of older people, will consider that human-human contact is sufficiently unimportant that older people can be left increasingly in the care of robots.

With respect to each of these points it is possible to identify some defeaters:

First, it seems unlikely, except perhaps in the very long-term, that robots will be able to work unsupervised in care roles, therefore care in the future might evolve to be performed by human-robot teams. Second, in these circumstances the number of human carers might be reduced but the role of human carers should become more professional (since it will include managing robots) and could therefore attract better pay and higher job satisfaction. Moreover, relieved of some of the more mundane care activities, such as cleaning, human carers may be able to spend *more* time in social interaction with those cared for rather than less. Currently, human care is not distributed evenly amongst older people, for instance, very high levels of care are provided to those in advanced stages of dementia who may not benefit most from the social interaction afforded by having human carers. Introducing robots for some aspects of care, can help to decouple the provision of social interaction from the support of other basic needs. Social support, from human carers, could then be more usefully distributed between those who will appreciate and gain from it.

Third, it seems paradoxical that at a time when we are expecting increasing numbers of older people, who will stay active longer, and who will be better connected through use of ICT technologies, that they will not respond to changes in the nature of care, such as the introduction of robots, by taking actions themselves to help meet their social needs. Indeed, the provision of robot services such as telepresence can directly promote improved social interaction with friends and relatives for people who might have physical difficulties leaving the home. As Sorrell and Draper [5] suggest, the baby-boom generation may well adapt very effectively to a more online social existence: "Computer literate, often umbilically tied to the Internet for work and play, they may find the transition to a world of virtual caring relationships and social life at a distance exceptionally congenial." ([5], p 42-3).

Fourth, demographic projections [4] show that, in the coming decades, developed countries will have a much higher percentage of older people than they do now. Older people, as a constituency, already have significant political power, and the demographic shift will only give them a stronger voice. Governments and other bodies delivering care are therefore likely to respond sympathetically to calls to maintain levels of human social interaction for the elderly. Certainly, in democracies, governments that ignore the welfare of older people are simply likely to be voted out. Robot carers will need to be introduced with sensitivity to the worries that people will have about reduction in human care.

In addition to the above reasons why the use of robots for care of older people need not be a slippery slope to

social isolation, it is important to recognise that there can be problems with human-delivered care. As documented, for instance, in the 2012 Equality and Human Rights Commission report [6] on dignity in care, there are also growing numbers of cases where human carers are abusing the human rights of the people they are supposed to looking after—through physical or verbal abuse, neglect, or actions such as stealing property. Poor pay, the use of migrant labour, together with inadequate training or supervision, means that many older people are not getting good quality care. There is a need to improve working conditions for human carers, and technologies such as robots, that can help carers to be more efficient and more professional, could contribute significantly to improved overall standards of care.

A similar critique of care robots for older people is presented in Sharkey & Sharkey's recent article, "The eldercare factory" [7], which also presents the potential loss of interpersonal contact as one of the key ethical concerns (amongst others). This article considers a range of arguments for and against care robots (see also [8] from the same authors), but its title depicts a slippery slope scenario, graphically described in the final line of the abstract—that "without forethought, the elderly may find themselves in a barren world of machines, a world of automated care: a factory for the elderly" ([7], p. 282). Readers might infer from this that the "eldercare factory" is not just an imagineable scenario but also a likely one. The article itself, though, eventually acknowledges that "this nightmare scenario might seem a little far fetched today" ([7], p.287). As a rhetorical device, the image of the eldercare factory is clearly a powerful way to bring attention to the potentially depersonalising consequences of using robots in care. My worry is the implication that we are already on track towards this profoundly dystopian future. If this is not the case, or if the likelihood of arriving there is very low, then highlighting this emotive scenario does not move the debate in a helpful direction. More specifically, it would seem to draw us away from a considered appraisal of the costs and benefits of alternative, and perhaps more likely, outcomes, in which assistive robots are simply part of the wider eldercare mix.

### **Robots and fear of psychological damage to children**

I have so far focused on care of older people, however, a similar case can be made with respect to the ethics of robot childcare. Here too, a slippery slope case has been presented [3] ("The crying shame of robot nannies: an ethical appraisal", Sharkey & Sharkey) that prolonged exposure to robot "nannies" could lead to children having difficulty forming secure attachments to people (particularly parents) and

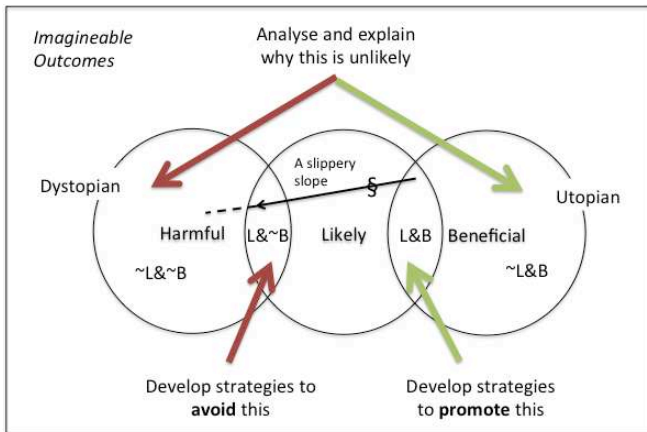
consequently having lifelong problems forming good relationships. Whilst acknowledging that "total [robot-based] child care is not yet being promoted" ([3], p. 161) the article spends some time exploring this worst-case scenario, for instance, comparing robot child care with the near-complete deprivation of maternal care in Ceausescu's Romanian orphanages. In other words, the worry is, once again, that we are starting down a slippery slope.

As with aged care, the issue is that focusing on the extreme worst-case risks over-emphasising an outcome that may be very unlikely. It is certainly possible to conceive of scenarios where neglectful parents abandon their children to care by robots for excessively long periods. On the other hand, we should recognise that most parents want social contact with their children and that bad parents don't need robots in order to show neglect. Bryson [9] points out a number of defeaters of the 'total childcare' slippery slope; for instance, that robot companies will want to avoid the expensive legal liabilities that come with taking responsibility for people's children.

Interestingly, there are parallels between current concerns about robots in childcare and the worries expressed about the widespread introduction of day care for young children in the 1970s. Here too, the initial concerns focused on the potential damage to the child of early separation from the primary care giver [10]. However, the debate about nursery care has broadened in recent years to recognize that the risks depend on the wider circumstances of the child. In particular, it is now acknowledged that good quality nursery care can be a real benefit to children whose home environment is disadvantaged, stressful, or dysfunctional [10]. In the same way, the debate about robot child care needs to carefully weigh up the advantages and disadvantages of involving robots in childcare. After all, many busy parents already make significant use of TVs and computers as ways of keeping children occupied and entertained. In this context, robots are simply another technology that can impact on the welfare of our children in some already familiar ways (such as discouraging traditional activities like reading), but could also be used in some novel ways to promote wellbeing (e.g. engaging children in physical games that provide exercise). It is also possible to imagine robots having a positive role in promoting better quality care from people, for instance by reminding parents to interact with their children, or by facilitating parent-child social interaction (for instance, by monitoring the safety of one child while the parent interacts with a sibling).

### The risks of not getting the balance right

It is important to think about the possible downsides of the robot technologies we are developing. By considering these carefully, and in advance, robots can be developed that have more beneficial social impacts, and the worst pitfalls can be avoided. A general strategy to achieve this is pictured below.



**Figure: A strategy for robot ethics.** Consider the space of imagineable outcomes which includes some that are beneficial to human welfare (B) and others that are harmful (~B). Some outcomes are likely (L), others unlikely (~L). (I picture these as binary classes though clearly both classifications could be graded.) This simple scheme leads to four categories of outcomes. ~L&~B are the dystopian visions of future worlds that are highly implausible even though they are imagineable. The role of the ethicist is to analyse these outcomes, assess what steps would be needed for them to arise, and explain why these scenarios are unlikely to play out. ~L&B, at the opposite extreme, are the unrealistic utopian visions sometimes promoted by the over-enthusiastic. Again the role of ethicist is to analyse and caution against exaggerated claims. L&~B are harmful outcomes that could happen. Having established the plausibility of such scenarios we should be proactive in developing strategies that avoid them. L&B are beneficial outcomes that could happen. Having established their plausibility we should actively develop strategies to promote them. The figure also illustrates a slippery slope where what we thought was an L&B outcome proves to be the start of a slide into the harmful category. Slippery slopes deserve to be analysed and we should develop safeguards (§) against any that have a convincing warrant; but we should also be sceptical of slippery slopes motivated by profoundly dystopian visions as the number of potential defeaters, or necessary steps, can make these scenarios highly unlikely.

It is possible that such analyses will conclude that there are domains of human activity from which robots should be excluded. However, research in robot ethics also has a duty to treat its topic in a balanced and fair way. Drawing undue attention to worst-case scenarios and slippery slopes fuels societal anxieties about robots already stoked up by science

fiction books and movies. Reinforcing fearful attitudes risks creating a climate where technologies that could be beneficial are made unwelcome, or even legislated against, leading to an opportunity lost.

In the European Union the ratio of senior citizens (65 or over) to working citizens (20 to 64)—the old age dependency ratio—is expected to change from 28 per cent in 2010 to 58 per cent in 2060. Taking into account dependents under the age of 19, by 2060 there is expected to be almost one dependent person (aged under 19 or 65 or over) to every one in work [4, 11]. Social care systems are already under severe strain, with almost daily reports of neglect in the care of older people (see, e.g. [6]). Governments are also under pressure to relax the rules on the maximum number of children that can be supervised by nursery staff (see e.g. [12]). What can we do to help the coming generations of workers who will be faced with this substantially increased burden of care?

There is a real possibility that robots can be developed to assist with aspects of child and older person care, not replacing human carers, but working alongside them and allowing them to be more effective in delivering those aspects of care that are best provided by people. Such developments can take place alongside (and not instead of) political and social actions aimed at mitigating the negative effects of the demographic shift. However, if, as the Eurobarometer survey suggests, people are already turning against the possibility of robot carers, even before they exist in any real way, then this is a significant worry—the costs of *not* developing these technologies to future human welfare, might actually outweigh the risks. Robot care may not all be sunny uplands but we should be wary of portraying it as nothing but slippery slopes.

**Acknowledgements.** I am grateful to Leila Prescott for proof-reading an initial draft of this paper. This work was supported by the Convergent Science Network for Biomimetic and Biohybrid Systems (FP7-ICT-CSN-248986).

### References

- [1] European Commission (2012). Public attitudes towards robots. *Special Eurobarometer 382*. [http://ec.europa.eu/health/eurobarometers/index\\_en.htm](http://ec.europa.eu/health/eurobarometers/index_en.htm)
- [2] Sparrow, R. and Sparrow, L. (2006). In the hands of machines? The future of aged care. *Mind and Machines*, 16 (2) pp. 141-161.

- [3] Sharkey, N., and Sharkey, A. (2012). The crying shame of robot nannies: An ethical appraisal. *Interaction Studies*, 11(2), 161-190.
- [4] Eurostat (2010). Demography report 2010. <http://epp.eurostat.ec.europa.eu/>
- [5] Sorell, S. & Heather Draper, H. (2012): Telecare, Surveillance, and the Welfare State, *The American Journal of Bioethics*, 12:9, 36-44.
- [6] EHRC (2011). *Close to home: An inquiry into older people and human rights in home care*. <http://www.equalityhumanrights.com/>
- [7] Sharkey, N. and Sharkey, A. (2011). The eldercare factory. *Gerontology*. 58(3), 282-8.
- [8] Sharkey, A. and Sharkey, N. (2012). Granny and the robots: Ethical issues in robot care for the elderly. *Ethics and Information Technology*, 14(1), 27-40.
- [9] Bryson, J. J. (2012). Why robot nannies probably won't do much psychological damage. *Interaction Studies*, 11(2), 196-200.
- [10] Scarr, S. and M. Eisenberg, M. (1993). Child Care Research: Issues, Perspectives, and Results. *Annual Review of Psychology*, 44 (1993): 613-644. 32.
- [11] Prescott, T. J. et al. (in press). Robot Companions For Citizens: Roadmapping the potential for future robots in empowering older people. *Proceedings of the Conference on Bridging Research in Ageing and ICT Development (BRAID)*.
- [12] BBC News (2013). Nursery ratios raised 'to improve standards'. <http://www.bbc.co.uk/news/education-21232270>, accessed 03.03.2013.