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ABSTRACT

Adolescents with end stage hip disease must decide whether to get a total hip replacement (THR) or a hip fusion procedure known as an arthrodesis. The decision is representative of many difficult medical decisions; the THR is better in the short-term but poses risks of wheelchair-reliance in middle age. Moreover, there is no single "best answer" to this problem given the heterogeneous tastes and circumstances of adolescent patients with end stage hip disease. Consumer sovereignty is the ordinary policy response to such heterogeneity, but even adolescents who are generally competent tend to be too myopic to make this decision prudently. Doctors should identify objective proxies for non-myopic tastes and either "nudge" patients towards acting on such tastes or inform them of the relevant proxies.

* James C. Gaither Professor of Law and Vice Dean, Stanford Law School. Thanks to Ashley Titan for research assistance, and to Dick Craswell, David Studdert, George Triantis, and other participants at workshops at Stanford and Vanderbilt Law Schools for feedback. This piece is dedicated to my dear friend, the late Fred Dietz. His work as an orthopedist, particularly in treating club foot in less developed countries, was of enormous importance. He retained amazing intellectual curiosity throughout his professional life and not only brought the surgical decision-making problem I discuss in this paper to my attention, but devised the survey of orthopedic surgeons that I discuss at length in the piece.

I. INTRODUCTION

Adolescent patients who present with an unstable slipped capital femoral epiphysis (SCFE)[1] are at substantial risk of the hip becoming necrotic.[2] If only part of the head of the hip joint becomes necrotic, the surgeon might simply reorient the ball in the hip socket. More typically, however, the patient is faced with the choice between arthrodesis (a hip fusion)—with the understanding that he or she will get a total hip replacement (THR) much later in life—or, instead, receive an immediate THR. Assuming a patient with end stage hip disease and a necrotic hip that cannot be saved by reorientation, there are two imperfect choices: immediate arthrodesis (typically to be followed by THR later in life) or immediate THR.

In the short term, and for a substantial period thereafter, the patient who receives the THR will almost surely be better off: he or she will have far better range of motion and less pain. Although patients can walk quite well *immediately* following an arthrodesis and some modest rehabilitation, they will typically develop fairly severe back pain, moderately severer ipse-lateral knee pain, and some contra-lateral hip pain, most likely about twenty years or so after the initial operation.[3] Moreover, those who have had an arthrodesis also often struggle with routine activities including donning and doffing socks, cutting toenails, riding a bicycle, and climbing stairs. Most immediately, patients who opt to get an arthrodesis also will typically walk with a pronounced limp, and the limp may have stigmatic impacts.[4]

In the long term, the trade-offs between THR and arthrodesis are more difficult to define precisely. The risks of THR involve the affected hip itself, which is subject to wear, loosening, and dislocation. The bottom line is that if an adolescent receives a THR, there is a non-trivial chance that the new joint will need to be replaced once and, barring substantial shifts in technology, the replacement procedure would be expected to have only modest success rates. There is a smaller chance that the hip replacement will fail

[1] When a patient presents with a slipped capital femoral epiphysis (SCFE), the head of the patient's femur has slipped backward and become dislocated from the hip bone.

[2] *See* D. Pack, *Slipped Capital Femoral Epiphysis: Diagnosis and Management*, 82 AM. FAM. PHYSICIAN 258, 261 (2010) (noting that avascular necrosis—the death of bone tissue due to interruption of blood flow—occurs in 60% of patients with unstable SCFEs).

[3] There are a wide range of plausible estimates in the literature about how severe pain is after arthrodesis and how soon it develops. The data suggests that back pain is the most severe complication and that ipse-lateral knee pain is the next most common symptom. Most reports suggest that pain typically does not become severe until fifteen to twenty-five years after the surgery, though there is non-trivial risk that it can begin sooner. Even if the longitudinal follow-up studies were better than they are, they might tell us relatively little about how patients generally would respond were fusions to become more widespread, since the existing follow-ups assess only those who receive the fusion operation, and the operation for the last half-century has largely been reserved for an atypical (and atypically impaired) subset of patients with deteriorating hips. At any rate, for fairly pessimistic views of the pain associated with arthrodesis, see H. Egawa et al., *Long-Term Follow-Up of Hip Arthrodesis in Young Adults*, 95 BONE JT. J. 169 (2013). For somewhat more optimistic reports, both in terms of pain severity and delayed onset, see M.V. Sahofroth et al., *The Long-Term Fate of the Hip Arthrodesis: Does It Remain a Valid Procedure for Selected Cases in the 21st Century?*, 34 INT. ORTHOD. 805, 807–09 (2010); J.M. Kirkos et al., *The Long-Term Effects of Hip Fusion on the Adjacent Joints*, 74 ACTA ORTHOP. BELG. 779 (2008).

[4] For a discussion of the stigmatic impacts of limping, see *infra* notes 26–28 in addition to 154 and accompanying text.

again and need to be replaced a second time, though in this instance, the chances of successful re-implantation are (again, barring substantial technological advances) rather poor. What that means, in terms of function, is that the adolescent patient who gets a THR has a significant risk of relying on a wheelchair (or, more rarely, canes or walkers) to meet mobility needs by early middle age to middle age.[5] The degree to which needing a wheelchair impairs function depends, of course, on features of the social environment not directly controlled by the patient (the accessibility of the places he or she seeks to go) and on the activities that the particular patient values.

My interest in exploring how to choose between THR and arthrodesis—who should make the choice, under what conditions, and how a decision-maker should think about the choice—comes from my sense that the decision likely requires some form of policy intervention.[6] I say it is *likely* the case because the truth is, I am interested in making a conceptual point about how to approach decision-making problems which have a particular set of features.[7] I argue that a decision with a combination of traits, some of which are linked in interesting ways, may best be handled with particular forms of policy intervention. I discuss these traits, and how best to respond to decision-making settings with these traits, over the course of this Article.

Part II of this Article demonstrates how the THR/arthrodesis decision itself, no matter who is charged with making it, is a difficult one to make. First, it is difficult: (a) because the factual outcomes that will eventuate from each available choice are uncertain,[8] (b) because these outcomes are difficult to commensurate,[9] and (c) because

[5] All of these risks associated with total hip replacements are discussed *infra* in the text accompanying notes 20–24.

[6] In this particular setting, a "policy" might not be set by law but by customary practice. I am suggesting a particular interpretation of the ideal method of eliciting consent to particular procedures by doctors, but I by no means suggest that those who do not elicit consent in these ways have performed surgery without legally adequate "informed consent." In other, partly parallel settings that I discuss, official government policy would be sensitive to views of how best to deal with myopic decision-makers.

[7] I believe that the THR/arthrodesis decision may well have this particular set of features, and I will try to demonstrate over the course of this Article that it is quite plausible that this decision has these traits. However, I recognize that I am unqualified to judge whether it truly does, not only because I would need to resolve disputes about the true probabilistic distribution of post-surgical outcomes that I am manifestly untrained to adjudicate, but because there are questions that psychologists typically pose about a diverse range of relevant issues (e.g., adolescent decision-making capacity; the degree to which people typically or invariably adapt hedonically to conventional disabilities but not to pain) and empirical sociological questions about the consequences of particular disabilities on functioning that are also far too controverted to permit me to reach confident conclusions.

[8] The most immediately accessible and most important example of this uncertainty is that it is not only uncertain that a particular patient getting a THR will require a wheelchair to meet mobility needs by middle age (there is a *risk* of that outcome, but that outcome is definitely not inevitable), but that there is no good estimate of the probability that any particular patient will require a wheelchair. But we will see that there are a host of other uncertainties, both about the direct impact of the operations—e.g., there are a range of beliefs about how many years of what level of pain we should expect the arthrodesis patient will face—but also about the *indirect* impacts of known outcomes as well. Will the limping that is nearly certain to result from an arthrodesis depress employment probability or wages (and by how much)? Will it reduce the probability of forming a long-term romantic relationship? *See infra* Part II(A)(1).

[9] The outcomes are incommensurable not in the philosophically or psychologically profound sense that trading off one for another seems morally impermissible, or shows an inadequate appreciation of the special or "sacred" features of the sacrificed option, but in the more mundane sense that the decision-maker

the gains and losses associated with each decision are experienced at very different points in time, requiring the decision-maker to weigh the interests of distinct selves in ways that are extraordinarily challenging.[10]

Second, and quite critically, patients have legitimately heterogeneous responses to this problem. Most straightforwardly, their factual circumstances differ in ways that make the probability of each potential outcome differ. Perhaps more importantly, though, patients may legitimately evaluate the distinct outcomes differently. This is true in part because many things described as "outcomes" are not simply final end-states but are also instrumental or intermediate to the achievement of further goals, and people will differ in their assumptions about the transformation process from intermediate output to final output.[11] But heterogeneity should also be expected because patients will simply evaluate true, final end-states differently.[12] Generally speaking, of course, if there is legitimate

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will feel that he or she experienced a deprivation that is so close in weight, and yet so distinct in kind from what was gained, that he or she is likely to experience a sense of loss at a minimum—and probably something akin to regret—even over a choice that he or she would reaffirm.

I discuss this point at greater length further, *see infra* Part II(A), but here is a preliminary way of clarifying it. When I choose to take the $20 someone offers me over the $10 that he tells me is my other option, I will typically neither feel as though I lost something by making the decision I made nor will I regret the failure to get the $10 *at all*; what I got is *precisely* like what I gave up to get it. What I received is just a *better version* of what I failed to get. When I give up time with my family (or act against my political principles) in order to take a job that pays more money, I may well (genuinely, rather than as a mere signal of emotional depth) mourn and regret the loss of family time (even if I think I made the right choice and would make it over again) because I still experience a loss. If all experiences were simply reduced to their abstract "utility-generating" properties, we would presumably never regret or feel a sense of loss from *any* decision any more than we would over the decision to choose more money rather than less when offered each without strings; rather, we would have always simply chosen the better version of the same thing (utility-generating states).

[10] The basic point is again straightforward: a decision-maker who is sure she would prefer *X* years of pain and *Y* years of limping to *Z* years of wheelchair-reliance might still find it hard to figure out if she prefers *X* years of pain and *Y* of limping starting *now* to *Z* years of wheelchair-reliance that will be experienced by a very distant future self. For a fuller discussion, see Part II(A)(3).

[11] Thus, for instance, two distinct choosers may each agree that young-adult life will be better along a number of dimensions (e.g., job status, relationship formation) if they get the THR rather than the arthrodesis now, but differ in their assessment of whether they think that the gains made in early life will do much to buffer them psychologically against the difficulties they might encounter in middle age. Or, they may agree that limping is socially stigmatizing, whether it should be or not, but differ in their views of the impact of being stigmatized.

One way of thinking about the first of these problems is to note that when my co-authors and I surveyed surgeons about which of the two operations they would recommend to four different hypothetical patients, we also asked them to answer certain "attitude" questions. While 41.8% of surgeons agreed with the statement that "a person's place in the world is largely established during young-adult life," 19.5% disagreed. In thinking about this second point, I note that prior to surveying surgeons on how to make the choice, my co-authors and I spoke to some physicians about the decision. We asked whether they thought a socially successful, physically attractive adolescent would be more or less adversely impacted by limping than a shyer, less attractive one. About half thought the attractive adolescent would be hurt more since attractiveness was key to his or her identity, and about half thought the unattractive one would be hurt more since he or she would have, in essence, little margin for social error and would not have the social skills to overcome making an initial stigmatic impression.

[12] Presumably, for instance, people will evaluate differently the loss of the capacity to engage in certain activities, living with pain, and how difficult it is to remain romantically unattached (and thus evaluate the increased possibility of these outcomes distinctly even if they agreed on what increase in probability they

heterogeneity, a uniform imposed response by a paternalistic expert is likely to harm some of the subjects of the decision.[13]

At the end of Part II, I discuss findings from a survey of orthopedic surgeons I helped conduct that demonstrates that the choice between the THR and arthrodesis is difficult—a fact demonstrated by the lack of consensus over which operation is appropriate in a range of cases—and that one's views of the proper choice are influenced not just by one's views of the likely physical outcomes of each operation but by the ways in which one *evaluates* the outcomes.

Part III of this Article addresses the decision-making competence of each party involved: the adolescent patient, the surgeons, and the parents or guardians. Perhaps most critically to my argument regarding this decision domain, the policy instrument typically preferred to cope with heterogeneity—remitting the choice to the affected party, in this case the adolescent patient, who will presumptively know most and care most about both his or her particular circumstances and tastes—is suspect because the decision-maker is myopic.[14] Moreover, instead of observing *appropriate* heterogeneity in choices, we may simply see uniform choices[15] that reflect myopic adolescents' undue discounting of a distant self.[16]

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would face). I largely set this concern aside but feel obliged to highlight another issue which seems important: yet another reason one should expect, if not necessarily extol, heterogeneity is that to the extent that there is no firm consensus about the probability of distinct factual outcomes, one would expect some people to accept one view and some another.

For instance, people who think of themselves as optimists in general may be more prone to be *technological optimists* who are atypically likely to think that the chance of immobility by the time they reach middle age is in the low range of credible estimates because "doctors will have come up with something by then" to make revisions better. While there is plainly *less* reason to encourage, or even permit, individuals to act on distinct factual beliefs than distinct tastes, even those non-libertarians who do not reflexively prefer individuals to make all self-regarding decisions may be moved by the argument that "beliefs" and "attitudes" are important to self-definition, in much the same way tastes for end-states are, and that the only way of taking another individual's belief seriously is not just to let a person maintain it, but to let him or her act on it. Take an extreme case: some may think of religious beliefs (or the opposite, anti- or atheistic, secular beliefs) as simple obvious error, but it would be odd to say that a commitment to free exercise permits one to believe (or disbelieve) in God, but not to act on the belief.

[13] In investigating the question of why we should expect heterogeneous choices here, I explore in some detail and ultimately reject the argument that we should expect that prudent choosers will nearly uniformly select the THR because the most plausible of the possible bad outcomes that might result from that choice—wheelchair-reliance in middle age—is a bad result to which they would hedonically adapt, while one of the key bad results of the arthrodesis— some period of chronic pain preceding the revision operation—is one of the very few negative experiences to which people do not hedonically adapt.

I discuss hedonic adaptation in greater detail in Part II(B)(4) of this Article, *infra*, but the very quick account is that psychologists who believe that we have strong tendencies to adapt hedonically to both bad and good events claim that we typically return in a relatively short period of time to the same equilibrium level of happiness that we had before the good or bad event. While we typically *forecast* that good or bad events will have significant impact on our levels of well-being, this is simply a forecasting error.

[14] Adolescent myopia is discussed in detail in Part III(A)(3), *infra*.

[15] There is, to the best of my knowledge, no good systematic information about adolescent patient preferences on this issue. This is quite unfortunate. When surveying physicians about the procedures they recommend, we considered asking physicians what preferences their patients express in these situations, but we were wary both that asking the question would distort their responses to questions about what they

Remitting the choice in an open-ended fashion to the surgeon alone is unlikely to work well for different reasons. Surgeons have little basis to make the decision: they can neither intuit the patient's underlying tastes nor can they make a plausible claim that one operation, rather than the other, increases the patient's capacity to function in meaningful domains, even should they embrace the controversial proposition that medical care should be directed not so much at utility maximization as capability maximization.[17] Worse still, the surgeon's preferences may be grounded in factors that have nothing at all to do with the patient's particular circumstances and tastes.[18]

Parents or guardians may not be well-positioned to make this choice because, consciously or not, they may seek to decrease the suffering that they themselves witness, rather than the suffering their children experience over the entire course of their lives. But even if the parents or guardians were abstractly the best qualified single decision-maker—less prone to under-weighing the interests of the middle aged than their children and less prone to conflating their own preferences and beliefs with the patient's than surgeons—forcing them to make the choice seems unduly stressful for a variety of reasons.

In Part IV, I will look at a possible set of solutions to this problem. The solution I analyze most sympathetically relies on utilizing objectively observable traits distributed across patients that stand in reasonably well as proxies for longer-term prudent, non-myopic subjective preferences. The argument in this Part is more suggestive than persuasive or ready-for-rollout into the world. In some sense, my hope is that my argument about the types of traits we should be looking for will push those with relevant forms of expertise to make the relevant factual judgments to work on this issue.

Even if I were right to suggest there are certain observables that correlate with the non-myopic preferences of the patients, we still must figure out what to do once those

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themselves thought was best and/or that their reports about patients would be distorted in the sense that they would tend to believe that their patients' views must have mirrored their own.

[16] The fact that the myopic choice for the THR is uniform, or close to uniform, may matter a good deal—we plainly *do* allow late adolescents to volunteer for the armed forces, smoke cigarettes, or climb mountains, though the risks of either death in the short run or death in the distant future that they take in making these choices may all reflect in part a lack of concern over their distant-future selves. Those late adolescents who choose to smoke may well do so in part because they often hold some variant of the belief, "who cares about developing lung cancer at 60?"; and those who volunteer for the armed forces may similarly care too little that they might not live to see middle or old age. However, for reasons I return to in Part II(A)(3), *infra*, myopia does not seem to drive virtually all decision-makers to the same position.

[17] The broad distinction, discussed more fully in Part III(B)(1) is that someone committed to maximizing the patient's utility is committed to making the patient better off *subjectively*, by his or her own lights (either by increasing his or her hedonic enjoyment of his or her experience or by meeting his or her preferences), while someone committed to maximizing capability is interested in the patient's objective capacity to meet a range of important goals—whether he or she derives pleasure or not from being able to meet whatever goals we might deem significant, or whether he or she would most prefer to be able to meet these goals.

[18] Most disturbingly, and perhaps surprisingly, a middle-aged or older surgeon may suffer from a weaker form of the myopia that makes us distrust adolescents to make the decision, overvaluing the significance of end-states that occur at his or her own age compared to those that occur to people at much earlier stages of life. Middle-aged physicians may be near-sighted looking backwards, just as the adolescent patient is near-sighted looking forward. *See infra* the discussion, based on the aforementioned physician survey, in Part III(B)(1).

proxies are observed. Part IV discusses the wisdom and possibility that the patient will have no role in the decision, that a particular choice will be dictated by the party aware of the proxies and their implications—likely the physician (the "hard paternalist" response). Part IV also discusses the possibility that the patient can select his or her preferred operation, but that we manipulate the choice architecture so it is easier to select the option suggested by the traits (the "soft paternalist" response). Finally, it is possible that the physician gives "paternalistic guidance" about the decision he or she thinks is best, based on the proxies, in addition to technical medical information about the probable outcomes of the surgeries.[19]

Part V concludes that it would be best to investigate what traits best predict stable long-term preferences for each operation. I further conclude that we should employ a variety of mechanisms to ensure that an adolescent possessing traits consonant with selecting arthrodesis and those with traits suggesting a THR better meets his or her long-term stable preferences is either induced to pick the "appropriate" operation or at least better understands why a choice is optimal rather than simply selecting the THR because it satisfies the adolescent's short-term myopic preferences.

II. THE DECISION IS DIFFICULT

Making the choice between the THR and arthrodesis is very difficult. In Sections A and B, I discuss *why* this is the case. In Section C, I present powerful evidence that it *is* a difficult decision and demonstrate that the reasons that I will have offered to explain its difficulty are indeed at play, focusing on a survey of orthopedic surgeons that reveals a low level of consensus over the proper choice.

There are three features that make this choice difficult: the cost–benefit calculation must be made in the face of high levels of factual uncertainty about both the expected physical outcomes from each surgery and the consequences of each physical outcome; the costs and benefits are difficult first to evaluate and then to commensurate (even if each were certain to be realized); and the benefits and costs are enjoyed (and suffered) at very different points in time.

[19] What I want to avoid, at all costs, is a general argument about whether it is *ever* appropriate to tailor policies in ways that account for—and differentiate the treatment of—decision-makers deemed deficient in some important fashion when the decision-makers are *not* properly thought of as globally incompetent to make the broad sort of decisions at issue. I must emphasize that I do *not* believe adolescents are incompetent to make medical decisions generally; I also do not believe that fact alone precludes concluding that, when it comes to making the decision between a THR and an arthrodesis, we should necessarily disdain policy instruments that are strongly paternalistic, more weakly paternalistic, or directive, or that simply require a decision-making and information-sharing process that pushes the adolescent to consider more factors than he or she might be asked to consider in making other medical decisions. Similarly, the fact that we may *push* pension savings to increase the rates at which myopic young adults and early middle-aged adults save for retirement—through some mix of incentives and defaults for instance—does not mean that we think those same younger adults are "incompetent" in some general sense. This is not the place to settle the argument about whether such policy interventions are justified or even whether there exists a "neutral" preference-respecting set of background conditions consistent with maximum respect for manifesting preferences. This Article is instead directed at those who seriously consider such policy interventions and are trying to figure out when to use them.

A. Uncertainty, Incommensurability, and Distinct Selves

1. Uncertainty

While the benefits of a THR are nearly certain to be enjoyed and many of the significant costs of arthrodesis are nearly certain to be suffered, the costs of a THR are not certain to occur. And, of course, the "benefit" of arthrodesis is simply *avoiding* the costs of a THR. This presents an information problem, wholly external to the decision-maker. There are a wide range of plausible estimates about the probability that any given adolescent who receives a THR immediately will end up depending on a wheelchair (or walker) to meet mobility needs in middle age, or suffer other untoward effects, including increased infection and mortality risk if both the initial hip replacement and revisions fail. This is true for reasons that appear contingent and potentially soluble: today there is simply inadequate epidemiological data to assess risk rates for each of the many varieties of initial THRs that have been done, for each type or revision of failed THRs, and for each set of patient traits.[20] One can see that the uncertainty problem is even worse than it

[20] Assume we are trying to ascertain how likely it is that a particular eighteen-year-old patient will depend on a wheelchair to meet mobility needs by fifty years of age if he or she gets a particular sort of THR. We would need to know the survival rate of the initial artificial hip and the success rate of the revision operation (and iteratively, know the survival rate of revised hips and the success rate of a second revision operation, etc.). There is some epidemiological data, of course, on the survival of various forms of artificial hips, but the data is by no means consistent. Callaghan et al. found that 22% of implanted hips (or their revisions) failed within thirty-five years of initial surgery, but few of the patients who received THRs were young at the time of the initial operation, and few received the precise form of artificial hip that each patient would receive today. *See* J. Callaghan et al., *Survivorship of a Charnley Total Hip Arthroplasty: A Concise Follow-up, at a Minimum of Thirty-Five Years, of Previous Reports*, 91 J. BONE JT. SURG. AM. 2617, 2618–20 (2009). There is also some data, again not entirely consistent, on the success rates of revision surgery. *See* P.T.H. Lee et. al, *Mid- to Long-Term Results of Revision Total Hip Replacement in Patients Aged 50 Years or Younger*, 96 BONE JT. J. 1047 (2014) (presenting a range of follow-up data on patients less than fifty years old receiving revision THRs, including data on the survival of the femoral and acetabular segment of the artificial hip, as well as data on a range of other medical complications); S. Lie et. al, *Failure Rates for 4,762 Revision Total Hip Arthroplasties in the Norwegian Arthroplasty Register*, 86 J. BONE JT. SURG. BR. 504 (2003). Lie et al. amalgamated a number of different forms of revision surgery but used a huge data set: they found a 25.6% failure rate of first revisions within just ten years. *Id.* at 508. Scheurs et al. found a much lower failure rate at the ten-year mark of just 10% but studied only a single revision procedure and studied a much smaller sample. B. Scheurs et. al, *Acetabular Reconstruction with Impacted Morsellised Cancellous Bone Graft and Cement*, 80 J. BONE JT. SURG. 391, 392 (1998). This is typical of the factual ambiguity that besets any decision-maker here.

There is also data on the "severity" of the most typical "bad" outcome that occurs when a THR fails. Patients at that point receive girdlestone resections, salvage procedures attempting to save a failed THR. These operations may succeed in permitting a patient to continue to walk, albeit with early fatigue, gait disorder, joint instability, limb discrepancy, and the need for ambulatory support. R. Muller et al., *Long-Term Results of the Girdlestone Hip*, 108 ARCH. ORTHOP. TRAUMA SURG. 359, 360–62 (1989); P. Yamamoto et. al, *Evaluation of the Function and Quality of Life of Patients Submitted to Girdlestone's Resection Arthroplasty*, 15 ACTA ORTOP. BRAS. 214, 215–18 (2007).

Aggravating the basic problem here is that most of the extensive studies follow patients who were middle-aged when the hip was first replaced, while adolescents and young adults may engage in activities more likely to result in the need for a second replacement operation than the activities of older patients, so the data may not be truly informative. The data on very long-term results for younger patients, though, is too thin to be wholly useful. Limited data is consistent with the theoretically plausible prediction that younger age is indeed associated with increased revision rates. *See* P. Santaguida et al., *Patient*

first appears by considering the differentiated responses respondents gave to the different vignettes in the surveys we administered to physicians.[21] It is *possible*, but by no means certain, that the risk of revision increases significantly—enough to change many of our respondents from recommending THR to recommending arthrodesis—when the patient has an atypically high Body Mass Index (BMI) or does manual labor as an adult. But

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Characteristics Affecting the Prognosis of Total Hip and Knee Joint Arthroplasty: A Systematic Review, 51 CAN. J. SURG. 428 (2008). The absence of long-term studies is troubling: even if we "knew"—as some suggest—that 96% of ceramic-on-ceramic hips implanted in adolescents were still functional when patients were studied, the average patient had had his or her hip for less than five years at the time of follow-up. *See* P. Finkbon et al., *Ceramic-on-Ceramic Total Hip Arthroplasty in Patients Younger than 20 Years*, 27 J. ARTHROPLASTY 1583 (2012). Kamath et al. also found very high success rates for younger patients, but examined patients barely four years out from the initial surgery. *See* A. Kamath et al., *Modern Total Hip Arthroplasty in Patients Younger than 21 Years*, 27 J. ARTHROPLASTY 402 (2012).

Moreover, there is little data that is adequately sensitive to distinctions in patient traits, and the data that distinguishes adequately between different forms of arthroplastic surgery is limited as well. Much of what we know about the operations we are doing may be dated: first, the patients receiving THRs now are likely to need the operation for a different reason than was historically the case. The most common reason, historically, to do THRs was to treat rheumatoid arthritis which would now more typically be treated with disease-modifying agents, so that most cases today would be cases resulting from osteonecrosis, as was the case we highlighted in our vignettes. More important, patients today would typically not receive cemented hips or the hard-on-hard bearing surfaces that were developed to reduce wear rates, but may also have led to intolerably high increases in adverse soft tissue reactions. As such, the authors of a relatively recent literature review have concluded that

> [T]he evolution toward the use of non-cemented implants, especially in younger patients, makes some previous reports historically interesting but of little current practical importance . . . . Improvements in bearing surfaces have contributed to the increasing number of these procedures done in very young patients. The introduction of highly cross-linked polyethylene has resulted in considerable reduction in polyethylene wear rates and osteolytis at mid-term follow-ups.

G.C. Polowski et al., *Total Hip Arthroplasty in the Very Young Patient*, 20 J. AM. ACAD. ORTHOP. SURG. 487, 488–90 (2012). The limited literature that is out there indeed suggests that revision rates may be lower for patients getting newer forms of surgery, particularly cementless arthroplasty, but the follow-up periods are too brief to be anything close to determinative. *See, e.g.*, J.C. Clohisy et. al, *Function and Fixation of Total Hip Arthroplasty in Patients 25 Years of Age or Younger*, CLIN. ORTHOP. 468(12): 3207 (2010); R.K. Takenaga et al., *Cementless Total Hip Arthroplasty in Patients Fifty Years of Age or Younger: A Minimum Ten-Year Follow-up*, J. BONE JT. SURG. AM. AM. 94(23): 2153–59 (2012). But there are also markedly more pessimistic follow-up studies suggesting high revision rates even when cementless THRs are used. *See, e.g.*, D. Hannouche et al., *Ceramic-on-Ceramic THA Implants in Patients Younger Than 20 Years*, 474 CLIN. ORTHOP. 527 (2016).

Furthermore, to give patients even the most straightforward "factual" information on surgical outcomes, we would also have to know how often THR surgery is successful when performed on patients who had received arthrodesis earlier in life, since adolescents offered arthrodesis would typically be told that the reasonable alternative to immediate hip replacement would be to convert the fusion to an artificial hip when they got older (both because the pain would grow increasingly difficult to bear and because, as they got older, the fear of needing an additional revision would decline). The literature, though, suggests that surgery to perform a THR for a patient who had received arthrodesis earlier in his life is less likely to be successful than THRs performed on those who had never received an arthrodesis, but the level of increased risk is not well specified. *See, e.g.*, K.P. Panagiotopoulis et al., *Conversion of Hip Arthrodesis to Total Hip Arthroplasty*, 50 AM. ACAD. ORTHOP. SURG. 2907 (2001); M.R. Whitehouse & C.P. Duncan, *Conversion of Hip Fusion to Total Hip Replacement*, 95 BONE JT. J. 114 (2013).

[21] These surveys are discussed in more detail below in Parts II(C) and III(B)(1).

there appears to be no medical consensus that higher BMI patients are more likely to require a revision, though some who have studied the issue do believe that to be the case.[22] Additionally, there is no consensus that patients who do manual labor are more likely to require revision,[23] nor any evidence that I have found that doctors can accurately predict which patients will do what sorts of work as adults.[24]

But it is also true that factual outcomes are uncertain for reasons that appear more unavoidable. First, we would need to have perfect foresight about progress in revision technology to know precisely how high the risk of immobility will be in approximately thirty years, when revisions to a loosened hip become necessary. Beliefs about the course of medical progress—whether more generally or more particularly in relationship to joint replacement surgery—naturally vary. Second, we would need to have perfect foresight about the patient's behavior because it may impact the probability that the first hip replacement will ultimately loosen and require revision.

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[22] Conflicts in the literature can readily be seen if one compares A. Lübbeke et al., *Differences in Outcomes of Obese Women and Men Undergoing Primary Total Hip Arthroplasty*, 57 ARTHRITIS RHEUM. 327 (2007) (obesity has negative impacts on both infection and dislocation, especially in women) with J.G. Andrew et al., *Obesity in Total Hip Replacement*, 90 J. BONE JT. SURG. BR. 424 (2008) and J.R. McLaughlin et al., *The Outcome of Total Hip Replacement in Obese and Non-Obese Patients at 10 to 18 Years*, 88 J. BONE JT. SURG. BR. 1286 (2006) (both finding no distinctions in need for revision between obese and nonobese populations). *See also* E. Yeung et al., *The Effect of Obesity on the Outcome of Hip and Knee Arthroplasty*, 35 INT'L ORTHOP. 929 (2010) (though survival rate for hip and knee replacements do not differ for the obese and nonobese cohort, postoperative function, particularly range of motion, is poorer for the obese population).

[23] The existing literature does not refer directly to risks associated with distinct occupations, but longitudinal studies measuring the impact of distinct activity levels are probably the best proxy available to draw conclusions about the impact of physical labor. Increased step activity does seem to increase the risk of revision. *See* R.K. Takenaga et al., *Which Functional Assessments Predict Long-term Wear After Total Hip Arthroplasty?*, 471 CLIN. ORTHOP. 2586, 2589–91 (2013). Adolescent patients who receive THRs may be physically capable of continuing to engage in low-impact sports activity and even some higher impact activity. *See* L. Dubs et al., *Sport After Total Hip Arthroplasty*, 101 ARCH. ORTHOP. TRAUMA SURG. 161 (1983); T. Visuri et al., *Total Hip Replacement: Its Influence on Spontaneous Recreation Exercise Habits*, 61 ARCH. PHYS. MED. REHABIL. 325 (1980). Although increased sports activity increases the risk of needing revision surgery sooner, the literature does not suggest what the shift in the lifespan of the artificial hip would be for different levels of activity. *See* A.G. Yun, *Sports After Total Hip Replacement*, 25 CLIN. SPORTS MED. 359 (2006).

[24] The fact that there is a modest increase in the proportion of surveyed physicians who recommend THRs for female patients may conceivably reflect a view that would be difficult either to verify or falsify that women are more adversely socially impacted by limping than are men, but it may also reflect beliefs that many of the physicians share, when asked directly, that women who have had fusion operations have particular problems with vaginal childbirth and problems with urination and sexual activity. Recent evidence suggests those propositions are simply not true. Claims that women who have had an arthrodesis will have difficulties with vaginal childbirth are rejected, with weak support, by Callaghan et al. and Barnhardt and Stiel. *See* J. Callaghan et al., *Hip Arthrodesis: A Long-Term Follow-up*, 67 J. BONE JT. SURG. AM. 1328 (1985). T. Barnhardt and J. Stiel, *Hip Fusion in Young Adults*, 19 ORTHOPEDICS 303 (1996). While there is weak support for the proposition that women may experience some increased difficulty with sexual activities in the same low-N study by Barnhardt and Stiel as well as in M. Sofue et al., *Long-Term Results of Arthrodesis for Severe Osteoarthritis of the Hip in Young Adults*, 13 INT'L ORTHOP. 129, 132 (1989), overall rates of reported satisfaction with arthrodesis are in fact higher among women, P.E. Beaulé et al., *Hip Arthrodesis: Current Indications and Techniques*, 10 J. AM. ACAD. ORTHOP. SURG. 249, 250 (2002).

Not only do we lack the most transparently germane information about the probability that any particular medical outcome will come to pass, information about the *effects* of physical outcomes is also limited and unclear. Here are just a few important examples of this second problem. Assume that a patient considering an arthrodesis is trying to figure out the impact that the nearly-inevitable limp the patient will develop will have on his or her employment prospects or prospects of forming romantic relationships. The patient may worry about these problems even if he or she recognizes that it is morally wrong for others to react adversely to limping and may even be legally impermissible in the employment context.[25] The data on the impacts of disability on life outcomes is considerably more limited than one might imagine.[26] Worse, still, the relevant studies are neither entirely consistent,[27] nor fine-grained enough in identifying subjects to permit us to assess the impact of each particularized disability (like limping),[28]

[25] Lawyers are accustomed to arguing that we should sanction (and thereby change) the undesirable behavior that causes unwarranted harm rather than force victims to change themselves so as not to face these unwarranted consequences (e.g., disparaging hecklers' vetoes or refusing to indulge at least certain forms of discriminatory customer preferences). This is not necessarily an ethically responsible strategy for surgeons (on the assumption that they effectively make choices for patients and on the assumption that they merely facilitate autonomous decision-making by providing information), nor is it necessarily a useful point to fix upon for patients trying to make self-interested decisions.

Plainly, of course, though, the meaning of having distinct physical capacities varies with the physical environment created by people other than the doctor and patient. What it means to keep someone from relying on a wheelchair surely depends in substantial part on how wheelchair-accessible the constructed external environment is. And, it is equally true that the consequences of any physical outcome are determined in part by a social environment that the patient and doctor do not fully control.

[26] My overall judgment is that sociologists typically believe that employment outcomes are somewhat worse for persons with physical disabilities, though obviously they attribute that shortfall in quite differing degrees to straightforward animus-based discrimination, failure to provide reasonable accommodations, and the physical or mental limitations of the subject population. For studies finding negative employment outcomes, see A.L. Janus, *Disability and the Transition to Adulthood*, 88 SOC. FORCES 99, 101–02 (2009); T. Wells et al., *What Happens After the High School Years for Young Persons with Disabilities?*, 82 SOC. FORCES 803, 826 (2003).

In terms of marriage and relationship formation, while the learning-disabled and those with multiple disabilities appear markedly less likely to enter a first marriage than the non-disabled population, rates (and age) of first marriages among those with physical disabilities seem not to differ much from rates (and age) of first marriages among those without physical disabilities. *See, e.g.*, M.D. MacInnes, *Altar-Bound? The Effect of Physical Disability on the Hazard of Entry into a First Marriage*, 41 INT'L. J. SOC. 87, 94 (2011). Similarly, physically disabled adolescents are typically as sexually experienced as their non-disabled peers. M.M. Cheng & J.R. Udry, *Sexual Behaviors of Physically Disabled Adolescents in the United States*, 31 J. ADOLESC. HEALTH 48, 57 (2002).

[27] Take the marriage issue. A number of studies *have* found, contrary to what I believe the strongest studies suggest, that people with physical disabilities are less likely to be married than non-disabled persons. *See, e.g.*, M.A. Nosek et al., *National Study of Women with Physical Disabilities: Final Report*, 19 SEXUALITY & DISABILITY 5, 15 (2001); G. Taleponos & M.P. McCabe, *Relationships, Sexuality, and Adjustment Among People with Physical Disabilities*, 18 SEXUAL & RELATIONSHIP THERAPY 25, 31 (2003). And there are relevant findings that might lead one to be suspicious of data-based findings that disability had no impact on the formation of romantic or sexual relationships: disabled people are often perceived as asexual. *See* M.S. Milligan & A.H. Neufeldt, *The Myth of Asexuality: A Survey of Social and Empirical Evidence*, 19 SEXUALITY & DISABILITY 91 (2001).

[28] The studies cited in this Article distinguish physical disabilities from other sorts (e.g., mental disabilities, learning disabilities, multiple disabilities) and sometimes distinguish serious from milder disabilities, but that is about as fine-grained as they get.

nor fine-grained enough in studying outcomes to judge whether adult prospects for someone who becomes disabled to be worse in subtle ways, compared to the outcomes that he or she could have expected absent the disability.[29]

2. The Outcomes Are Difficult to Evaluate and Commensurate

Assume, for argument's sake, that the negative and positive outcomes of each operation were both certain to occur and certain to occur in essentially the same time period. For instance, one would alternate over the whole life cycle year-long periods of suffering from the negative impacts of the arthrodesis (e.g., severe pain, limping) with periods of compromised mobility (wheelchair or walker use). Comparing these two negative outcomes and making an ordinal ranking of the different suffering options does not raise issues of moral incommensurability typically raised either by prescriptively-focused philosophical commentators who believe that certain goods are rightly regarded as incommensurable. For instance, to take a standard example, consider the possibility that it is morally troublesome even to consider whether you would be willing to betray a friend if receive a sum of money in return for doing so.[30] Think too about claims made by

[29] No one, in doing the survey research, compares the jobs that employed disabled adults have with the jobs they might have had but for the disability. Obviously, though, a person who believes he or she has been disadvantaged by limping may be concerned that he or she will not do as well as he or she otherwise would, even if he or she ends up employed. And there is certainly evidence that disabled workers are marginalized by both bosses and other workers in ways that suggest not only that the work they are allowed to perform is intrinsically less rewarding, but also that wages and advancement would be suppressed. *See generally* Pamela M.R. Robert & Sharon L. Harlan, *Mechanisms of Disability Discrimination in Large Bureaucratic Organizations: Ascriptive Inequalities in the Workplace*, 47 SOC. Q. 599, 602, 606–09, 610–12, 615–19 (2006).

Similarly, but to an even greater extent, no one studying sex and marriage has, to the best of my knowledge, figured out whether disabled persons feel they have sexual relationships with (or have married) people they are as happy to have those relationships with as the people they *would have* been involved with absent the disability. It is obviously uncomfortable even to consider the possibility that one is marrying (or has a relationship with) a "lower-quality" partner, but it is by no means clear to me that a patient considering the impact of a limp would not think there *are* such higher- and lower-quality partners, and that limping may compromise access to ones he or she finds more desirable. Of course, if one wants to push further on the uncertainty problem, one might note that we know very little about whether people would actually end up "happier" (whatever that might mean) if they did end up with partners they thought were "more desirable."

[30] Commentators describing a choice set as containing incommensurable options may mean very different things. Some believe that the values associated with end-states are incommensurable if they cannot be reduced to a single cardinal metric (like "utils"), though more typically, end-states are deemed commensurable so long as their values can be compared (that is to say, given ordinal ranks). A variant of this descriptive argument that has always struck me as especially unhelpful is that two end-states are incommensurable in value if one option is not superior, inferior, or equal in value to the other. The argument most typically attributed to Joseph Raz that has been made for thinking of options as incommensurable in this sense starts with the proposition that, when choices between incommensurable items feel very hard, our first misleading intuition is that the options are equal in value. But if they were truly equal in value, a small improvement in one option would make it clearly dominant: thus, if we could truly compare, say, the value of making more money with the value of spending time with family and felt each option was of equal value, a $100 bonus would make the choice to take the higher paying job easy. That this argument— confusing epistemological uncertainty with incommensurability—is a poor one can be seen easily if one considers two people who seem of equal weight. If I learned that one of the two had gained two pounds overnight, I *still* might not know which is heavier, though weights are clearly

descriptively-focused psychologists who claim that, as a matter of fact, people treat certain goods as "sacred" and not subject to trade-off.

The problem that the decision-makers face here is *not* that making the trade-offs in this situation is morally offensive or perceived as such. Instead, the first problem encountered in this situation could be described as quasi-informational, though the information is not about the world external to the chooser but about his or her own subjective reactions. To figure out which outcome is worse requires either evaluating bad end-states that we, as decision-makers, have had little practice evaluating, or evaluating feedback from our prior "consumption" decisions. Not only have we not had the chance to observe our reaction to the precise end-state we must now choose or reject, the end-states that we must evaluate do not seem strongly comparable or analogous to experiences that we have had. Moreover, we have almost no idea how these end-states will impact our lived-out activities and feelings once we actually have lived with these physical conditions. At best, we will be able to focus on how much we now enjoy whatever we will be missing when we lose the positive end-state that these negative outcomes imply we will lose. Although, for instance, we can reflect on how much we like to walk around now, the truth is that not being able to walk is not simply the loss of that pleasure, since we will not simply stop doing everything associated with walking but will instead live *differently*, if not inexorably worse, in ways which are quite hard to envision.[31]

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commensurable and on a single scale. *Compare* JOSEPH RAZ, THE MORALITY OF FREEDOM 321–66 (1986), *with* Leo Katz, *Incommensurable Choices and the Problem of Moral Ignorance*, 146 U. PA. L. REV. 1465, 1466–68 (1998).

Many instead treat the claim that values are incommensurable as a claim that is at core more normative than descriptive: it is not the case that subjects *cannot* compare the value of options but that if they attempt to make certain choices by comparing their values or, especially, by reducing their value to a single metric, they will lose focus on the unique qualities of the end-state and lose the ability to engage and appreciate it appropriately.

There are other normative claims as well: hard-to-quantify features will be unduly ignored in attempts to commensurate end-states *or* the achievement of certain ends should always *trump* the achievement of other ends rather than being traded off, as a marginalist would. The trumping view holds that the end-states *are* comparable; one simply has lexical priority over the other. For a fuller discussion of these points, see MARK KELMAN, THE HEURISTICS DEBATE 178–92 (2011).

[31] I return to two interconnected issues raised by this observation later. First, to what extent should we account for hedonic adaptation—the tendency of people to re-equilibrate at the same stable hedonic level rather quickly after exposure to seemingly negative or positive events—and the possibility of differential hedonic adaptation to different outcomes in making these decisions? Second, to what degree are mistakes in hedonic forecasting—figuring out what will and will not improve welfare levels in the future—a product of the failure to account for hedonic adaptation generally? The quick preview of the point I will make later is that reports of hedonic adaptation, like the reports that Mark Twain heard of his own death, are significantly exaggerated. But it is important to think about how decision-making in this area should be affected if one were more convinced than I am that the hedonic-adaptation scholars were actually on to something. For a fuller discussion, and citations to the relevant literature, see Part II(B)(4), *infra*.

For now, though, the main analytical point is simple: the choices grounded in our hedonic forecasts might be especially poor if we unduly discount the possibility of adapting to some, but not all, end-states. Of course, if we fully adapt to all changes, and do so in the same way no matter what outcome we must adapt to, choices have no long-term hedonic consequences anyway. (In the words of what I take to be the best one-line joke in the one-line joke canon, "Nothing matters, and what if it did?").

There is a second point, though, that interacts with the uncertainty/expected-value point. Assume that as a general matter, we overestimate the impact of a given negative outcome on our overall life

The difficulty is not simply a lack of self-knowledge, however. In my view, a choice should be seen to necessitate evaluating strongly incommensurable outcomes when, but only when, we see the choice as "tragic." Certain choices subjectively "feel" tragic in the sense that we feel an irreducible sense of loss when we have to choose some course of action or end-state over another, even if we would affirm the decision we made. The easiest of ordinary choices are experienced as having contributed to or detracted from the achievement of a one-dimensional goal, and thus give rise to no sense of irreducible loss from abandoning the unchosen end-state because all action courses would simply involve the ambition to maximize the achievement of a single end. Here is how I put the point in a separate piece discussing this issue:

> Think about choices in which gains and losses *are* clearly thought of one-dimensionally – e.g. choices in which we evaluate outcomes solely in terms of how much money they generate. If we put one dollar in a slot machine and the gamble turns out to pay out one hundred dollars, the decision (a plainly good one, looked at *ex post*) does not give rise to an experience of loss of the dollar we stuck into the machine. We do not think we irreducibly lost something to get something else. We simply *made* $99, net, on balance. The example does not, I think, turn on the truncated temporal frame. If we are evaluating jobs solely in terms of how much income they generate and we give up job Y to take some higher paying job X, we will not feel a sense of loss about abandoning job Y. If we simply toted up how many 'utils' we lost when we sacrificed time with our family compared to the amount we might gain to achieve the utility that we derived from the respect of our peers if we worked longer hours on a common project, we would not feel a sense of irreducible loss from losing time with the family *so long as maximizing utility were our one-dimensional, sole goal*. Instead, if the choice were 'correct,' we would simply think we had gained some amount of utility, on balance, from taking the overall course of action that we took. The subjective sense that making a 'better choice' does not obliterate the losses associated with

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satisfaction because, whenever we *focus* narrowly on a particular outcome (e.g., pain or immobility), we tend to forget that we will, in our actual lives, be focused on other experiences as well. We will often then avoid risking the poorer of the two outcomes, believing it to be more consequential than it is. We may believe the aggregate hedonic consequences of either immobility or pain are more severe than they are because it is such a salient "bad" that we have a good deal of trouble imagining that we will care about anything else, though this will not prove to be the case. The distance between two bad outcomes is likely to be overstated if one hyper-focuses: looked at on their own, immobility may seem radically worse than pain. But the entirety of our lived experience might be much more similar, no matter which narrow outcome eventuated, since the impact of each is so dampened when looking at the big picture. (We may "know," for instance, that immobility is twice as bad as pain, that it detracts twice as much from happiness levels; but if each accounts for only one-tenth of otherwise identical lives, the life lived with mobility is only about 11% better, not twice as good, than life lived with pain, dropping utility levels from 90% to 80% of the prior levels experienced absent either problem). When evaluating an option in which we *risk* the bad outcome, the fact that we have made the ordinal judgment correctly (say, e.g., immobility is worse than pain) is not enough if hyper-focus leads us to overstate the cardinal distance between them. I discuss hyper-focusing issues in Part II(B)(4), *infra*.

> renouncing the untaken path reflects the fact that the losses are of their own particular sort and are not precisely counterbalanced by gains of a different type. . . . The gains are not just weightier versions of the same, negated kinds of outcomes as the losses.[32]

With respect to tragic choices, the sense of authentic loss and regret when one selects one option over another almost surely comes from a confluence of features that the choice situations display: the options are "different in kind" and the decision a "close call." People are unlikely to feel some unavoidable regret over a choice, or experience a sense of loss over what they failed to get, if utility gains substantially outweigh losses even when they lose something very different from what they have gained.[33] I suspect that the phenomenon I am describing is heightened too when the *unchosen* good is the

[32] KELMAN, *supra* note 30, at 182–83.

[33] Here is an illustration: I had to leave a small sum of money on the table to avoid betraying a friend, and I think I got *a lot* more utility out of showing loyalty to the friend, despite the differing nature of these two choices. This position is supported by the literature I cited on protected goods and taboo trade-offs.

more meaning-imbued option, rather than simply distinct in kind from the chosen one.[34] In that regard, for instance, one is more likely to *regret* tolerating betrayal to make money than to regret giving up money to avoid betrayal, because regret, a ruminating activity, may be more commonplace when there is reason for shame or guilt. Still, I do not think that only meaning-laden losses are the source of future rumination and associated difficulties in *ex ante* decision-making. It is plainly *not* an aspect of the surgical choice at issue here, which involves simply decisions to tolerate (or refuse to tolerate) very different and significant life burdens.[35]

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[34] The meaning-imbued and the conventional good are equally *distinct* from one another, of course; difference is never one-directional. Psychologists studying "sacred" goods and "taboo tradeoffs" attempt to *describe* rather than extol certain sorts of deep incommensurability. One psychological analysis of this discomfort is provided by the "taboo tradeoffs" theory, associated early on with Fiske and Tetlock. *See* Alan Fiske and Philip Tetlock, *Taboo Trade-Offs: Reactions to Transactions that Transgress the Sphere of Practice*, 18 Pol. Psychol. 255 (1997). Standard cost–benefit analytical techniques that reduce all options to a common metric do violence to normative distinctions that people value as ends in themselves. In this view, people understand that taboo tradeoffs are unavoidable in the sense that there is a limit to the resources we will spend to enhance for example the safety of ourselves or others; but attempts to put an explicit price on the value of human life will inevitably encounter resistance: "It is gauche, embarrassing, or offensive to make explicit trade-offs among the concurrently operative relational modes." *Id.* at 273. See, also, for an interesting perspective on the issue, Robert MacCoun, *The Costs and Benefits of Letting Juries Punish Corporations: Comment on Viscusi*, 52 Stan. L. Rev. 1821 (2000).

More generally, psychologists have studied "protected values," focusing on end-states that are not readily traded for other gains. Baron and Spancra summarize their initial exploration of such values in the following terms:

> Protected values are those that resist tradeoffs with other values, particularly economic values. We propose that such values arise from deontological rules concerning action. People are concerned about their participation in transactions rather than just with the consequences that result. This proposal implies that protected values, defined as those that display tradeoff resistance, will also tend to display *quantity insensitivity*, *agent relativity*, and *moral obligation*. People will also tend to experience *anger* at the thought of making tradeoffs, and to engage in *denial of the need for tradeoffs* through wishful thinking. These five properties were correlated with tradeoff resistance (across different values, within subjects) in five studies in which subjects answered several questions about each of several values, or in which they indicated their willingness to pay to prevent some harmful action. These correlations were found even when the subjects could not tell the experimenters which values they were responding to, so they cannot be ascribed entirely to subjects' desire to express commitment.

Jonathan Baron and Mark Spranca, *Protected Values*, 70 ORG. BEHAV. & HUM. DEC. PROCESSES 1 (1997).

[35] I find it a tough question whether decision-makers will feel *some* of the sense of loss whenever they have had to make a hard "close call" decision, *even when the unchosen good and chosen good are similar*. It is hard in part because it is rare to make choices between very similar things that are also weighty enough to ruminate about. For instance, if the chooser likes both cherry-vanilla and green-tea ice cream and foregoes the green tea, it is hard to know whether the chooser does not feel a sense of loss simply because what he or she gave up is rather trivial or because he or she got the better version of what he or she wanted. One might flip the analytical point and argue that what it means for goods to be incommensurable is that one feels a sense of loss at not acquiring one, no matter how much they might at first blush seem alike. An external observer may think one is getting "the same thing" out of the trip to Venice that one chooses over the trip to

Giving up middle-aged mobility (an outcome the immediate THR risks) is hard to commensurate with limping (an outcome the immediate arthrodesis is more certain to entail); whichever option the patient chooses, he or she will give up something that is quite wrenching to give up.

3. Time and Distinct Selves

Perhaps most difficult of all, the positive and negative impacts of THR and arthrodesis occur at radically different points in time. Even if the negative impacts of a THR were certain to occur and they were meaningfully comparable to and "worse" than the negative impacts of the arthrodesis, they would occur in the very distant future, arguably occurring to a self that is so distant that many of us would have difficult really thinking of it as "us" at all. And we may be even worse at attending to mere *risks* to distant selves, more prone to believe that the possible negative outcome is so far in the future that something in the world will have changed before it occurs to us to prevent such outcome from happening. But even assuming that we have *some* capacity to consider future harms seriously, figuring out an apt discount rate is a challenge that we do not face in making many decisions.

Naturally, we do make many decisions that show we have regard for our future selves and that demonstrate the capacity to trade off current or short-term benefits for future benefits: quitting smoking, saving for retirement, etc. I need not claim any more for these purposes than that these sorts of decisions are more difficult to make than those that involve no temporal dimension, but I would note several additional points. First, the THR/arthrodesis decision may be more difficult than the decision to stop smoking because it does not involve a shame-provoking trade of "mere pleasure" for an awful future outcome, but rather involves picking between outcomes one could shamelessly dread in two distinct time periods. The person who arguably sacrifices his or her future self by getting a THR has not done so self-indulgently in the same way that the smoker has, so he or she will not be restrained from discounting the future by any ordinary variants of moralism or a desire to develop (or at least exhibit) more self-control.[36] Second, it is not so clear that we make many choices that actually protect future selves in ways that demonstrate that we treat them as just as important as present selves. While there is a far richer debate among economists on this issue than I could possibly detail here, suffice it to say that many economists believe there is generally little consumption smoothing over the lifetime of typical savers, even given some credible private discount rate for future consumption.[37] Rather, non-mandated savings may occur more because of elaborate sociological pressures of the sort Max Weber felt motivated a subset of the

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Rome one foregoes, but if one feels a particular sort of sense of loss—not a sense that one is insatiable but the sense that one abandoned an important goal—then, if this view of incommensurability is right, the goods plainly *did* meet distinct aims.

[36] I develop this point further in discussing why adolescents may make some future-protecting decisions even if myopic. *See infra,* note 133 and accompanying text.

[37] For a reasonable non-technical summary of evidence against the notion that people smooth consumption out over the life cycle, accounting for time preference and the risk of death, see R.H. Thaler, *Anomalies: Saving, Fungibility, and Mental Accounts*, 4 J. ECON. PERSP. 193 (1990).

population to value accumulation[38] or out of either precautionary motives[39] or dynastic bequest motives,[40] or because (according to what is termed a disequilibrium savings hypothesis) during periods of rapid income growth, high earners have not yet learned to spend everything they have gained access to on current consumption.[41]

The fact that the patient either will or merely *may* suffer at distinct times does not simply raise the problem of myopia, of unduly discounting temporally distant selves. It instead exacerbates the option-evaluation problem even for a non-myopic decision-maker because assessing the precise consequences of events may vary depending on when in a person's lifecycle they occur. It is not clear, for instance, that physical problems that limit social engagement or work capacity are not worse to bear for younger people, nor that pain is harder to accept when one is young enough that one reasonably expects to be pain-free or socializes with others who are more or less pain free. Conversely, it is not clear whether one's ability to acquire new routines or interests that compensate for losses is not higher when young or that income-reducing disabilities are not more hedonically salient if they result in declining income rather than merely lower income throughout life.

Negative impacts of the THR occur, if they occur at all, at a different time in life than one enjoys its benefits. Choices that require balancing gains at one point in the lifecycle against losses at others are simply more difficult to make than those that require assessing our reactions to distinct outcomes we will experience at the same point in time.

B. Heterogeneity

What further complicates this difficult decision is that there appears to be no single right answer to the problem. It is not simply that it is difficult to determine what the "right" answer might be, but it is implausible that there is a one-size-fits-all choice that is optimal for each and every patient. Even if one had no independent interest in promoting autonomous individual choice, there is no single ideal paternalist solution. Heterogeneity of both objective circumstances and subjective tastes makes it likely that in our ideal world, not everyone would do the same thing.

1. Heterogeneity of Objective Circumstances

Most obviously, as discussed earlier, the risks of wheelchair-reliance in middle age may vary, depending on the characteristics of the patient. There is controversy on all

[38] *See* MAX WEBER, THE PROTESTANT ETHIC AND THE SPIRIT OF CAPITALISM (Talcott Parsons trans., 1930) (1905).

[39] For a discussion of precautionary motivations for saving and a review of literature skeptical of its significance in explaining most savings behavior, see M. Browning & T.F. Crossley, *The Life-Cycle Model of Consumption and Saving*, 15 J. ECON. PERSP. 3 (2001). Precautionary savers clearly care *some* for their future selves; they do not want to run out of money altogether and cannot predict precisely when they will die. But they do not necessarily treat the interests that their future selves have in consumption as just as compelling as the interests that their current selves have as would a party who sought to smooth consumption over the course of his or her lifetime.

[40] For a discussion of bequest motivation, see B. Douglas Bernheim et al., *The Strategic Bequest Motive*, 93 J. POL. ECON. 1045, 1645 (1985).

[41] The most forceful piece advocating this disequilibrium savings hypothesis was S.A. Marglin, *What Do Bosses Do?* (pt. 2), 7 REV. RADICAL POL. ECON. 20, 24–37 (1975).

of these issues, but it is plausible, for instance, that patients with a higher BMI and those that continue to be physically active (either as a result of work demands or because they are non-compliant with suggestions about appropriate leisure activities) are more likely to require revisions of the initial THR.[42] But there are a host of other objective circumstances—generally more difficult to observe—that are, in essence, intermediate to the sorts of end-states that we typically subjectively evaluate: a limp may *differentially* impact each particular patient's capacity to earn a living or attract a mate,[43] the recreational activity one most frequently engaged in before the injury and surgery may be an activity that one would have to give up whether or not one has received a THR (e.g., basketball) or be an activity that one need not give up with a THR but would likely have to give up if one has received an arthrodesis (e.g., certain low-impact forms of hiking and hunting).

2. Heterogeneity of Tastes

We would also expect people to differentially evaluate the relevant end-states that may or may not occur depending on their choice. To take just a small sample of issues, some people may be more pain averse than others; some may value walking more than others; some will be unhappier, rather than either angered or indifferent, if they think people are staring at them or devaluing them because they limp; some will be more bothered than others if the arthrodesis precludes them from engaging in certain sexual activities than others would be.

We would also expect people to have different tastes for risk. Two parties, each of whom evaluates middle age immobility in precisely the same way as a markedly poorer outcome than suffering earlier physical difficulties, could still choose different operations if one party was more tolerant of risking the bad outcome and the other was more risk averse.[44] Just as some risk-neutral or risk-seeking parties might engage in a dangerous

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[42] *See supra*, notes 22 and 23.

[43] *See supra*, notes 26 and 27 and accompanying text; *see also infra*, note 200 for comments on the *general* impact of physical disability.

[44] Thinking about risk proclivity more carefully helps illuminate the difficulties we might have in distinguishing situations in which decision-makers are situated in different circumstances from those in which they merely have different tastes. It is not that the distinction is invariably useless. For instance, in figuring out why two different consumers may abjure child-proof medicine bottles, it is important to distinguish between those who disdain them because they head households with no children in the home (distinct circumstances, lowering the objective probability of poisoning) and those who are more willing to tolerate the risk of poisoning rather than deal with the added difficulty of removing child-proof caps or perhaps their added cost. *See* KELMAN, *supra* note 30, at 174.

But how should we characterize risky investing by relatively impoverished decision-makers? Is poverty a good proxy for a taste—lower risk proclivity—or is it better thought of as a circumstantial state that changes the actual consequences of the bad results that an investor risks? It may seem more like a circumstance if we believe that if that same poor person won the lottery, he or she would be just as stably risk-tolerant as richer people tend to be. On the other hand, it would seem more like a distinct taste if we simply believe that every person's risk proclivity at each point in time is some indeterminate product of unchanging personality and a set of judgments about the likely hedonic consequences of both the good and bad outcomes that could occur after the gamble—consequences that are themselves inexorably in part circumstantially sensitive. Distinctions between heterogenous tastes and circumstances are explored in detail in Jacob Hale Russell, *Misbehavioral Law and Economics*, 51 U. MICH. J.L. REFORM 549, 553, 562–71 (2018).

sport (e.g., mountain climbing) while another more risk-averse party might forego it, even if each had identical beliefs about the probability of death or injury from the activity and evaluated both the gains from the activity and the losses from death or injury identically, so would we expect variations in response to the risk of serious changes in middle age mobility.

3. Relevant End-States Are Not Hierarchically-Ordered "Functionings" or "Capabilities"

Policymakers and physicians conventionally argue that it is simply a matter of subjective taste whether a certain sort of pain is "worse" than certain sorts of mobility limitations: medical decisions should be made that respond to consumer preferences about outcomes.[45] Assume, though, that some observers adopt a more controversial non-taste-based, non-welfare-based view of the role of medical care. In this more controversial view, medical providers might be duty-bound to provide care that maximizes either the patient's functioning or capability to function,[46] rather than to provide services that maximize the patient's utility.[47] For these purposes, it does not

[45] There is a literature too voluminous even to contemplate summarizing both supporting and criticizing the proposition that doctors should respond to the informed autonomous preferences of their patients. Summaries and critiques of the conventional position that consumers will and should choose health care options that they believe will make them best off given their own conceptions of what it means to be best off can be found, for instance, in G.C. Bullock, *Free Choice and Patient Best Interests*, 2014 HEALTH CARE ANAL. 1 (2014), and M.J. Sirgy et. al., *Consumer Sovereignty in Healthcare: Fact or Fiction*, 301 J. BUS. ETHICS 459 (2011). More general classic defenses of respecting patient autonomy and detailing what it might mean to do so in particular contexts can be found, for instance, in C.E. Schreider, *The Practice of Autonomy: Patients, Doctors and Medical Decisions* (1991), and A. Buchanan, *Medical Paternalism*, 7 PHIL. & PUB. AFF. 370, 387–90 (1978).

[46] In Amartya Sen's well-known taxonomy, a functioning is a valued thing that a person can *do* (e.g., get from place to place, participate in the life of the community, or appear in public without shame) or *be* or *have* (e.g., be well-nourished or self-respecting). A capability is the capacity to achieve a functioning. Functionings are distinct from utility—however defined—which is more wholly subjective (different individuals may value getting from place to place differently or even hardly value that ability at all). Functionings are also distinct from resources, which are less individually dependent (e.g., *X* and *Y* may each have the same resources—the same amount of food, the same income—but *X* may end up less well-nourished due to pregnancy or suffering from a metabolic disorder, or have the same access to resources but be less able to get around because of a mobility impairment). Capability is distinct from a functioning as well: *C* and *D* may each be malnourished but *C* may be fasting and *D* may be poor. *C* may thus seem to have the capability to be nourished that *D* lacks. Capability shortfalls can come from absence of material resources, from socially imposed restrictions (e.g., women may frequently lack capabilities to participate in community life or to realize life plans that cannot be traced to their lack of access to material resources; the "relatively" poor in rich countries may have more resources than "middle-class" persons in less developed countries but be less able to "appear in public without shame" because social expectations of what one needs either to own or consume in order to "belong" are more demanding), or from idiosyncratic personal variations (e.g., the sorts of distinctions in the capacity to convert resources to functionings that the metabolic disorder example illustrated). For the canonical discussion, see AMARTYA SEN, INEQUALITY REEXAMINED (1992).

[47] *See e.g.*, P. Anand, *Capabilities and Health*, 31 J. MED. ETHICS 299 (2005) (applying Sen's capabilities approach to individual medical decisions, in this case the right to die, and at the level of social choice). For efforts to apply a capability or capacity approach to narrower fields of medical practice, see J. Simon et al., *Operationalising the Capability Approach for Outcome Measurement in Mental Health Research*, 98 SOC. SCI. & MED. 187 (2013) (describing the use of a capabilities metric as opposed to a QALY (Quality-Adjusted Life Years) scale in assessing the health status of mental-health patients); M.A. Verkerk et al.,

matter whether utility is defined as preference-satisfaction or as experienced hedonic reactions to events.[48]

Even if one believes that physicians *should* seek either to improve patient functioning or expand a patient's capabilities, even when that decision flies in the face of what the patient chooses[49] or what turns out to maximize the patient's experienced "happiness,"[50] it is not clear that the physician would be able to make a recommendation.

Health-Related Quality of Life Research and the Capability Approach of Amartya Sen, 10 QUAL. LIFE RES. 49 (2001) (describing how healthcare practitioners can operationalize Sen's approach to measure quality of life).

[48] For a discussion of the distinction between preference-utilitarianism and more traditional Benthamite hedonic utilitarianism, see M.G. Kelman, *Hedonic Psychology and the Ambiguities of Welfare*, 23 PHIL. & PUBLIC AFF. 391 (2005). Welfare was classically defined by Benthamite hedonic utilitarians as a *sensation* (pleasure net of pain). But the claim that subjects' welfare is increased when and only when they achieve a particular kind of sensation is incompatible with respect for diversity of life ends. Preference utilitarians sought to avoid this difficulty by arguing that people achieve welfare through the satisfaction of their preferences for any end-state they select, thus remaining officially agnostic about what it is people do or should prefer. That strategy, however, does not solve the problem posed by hedonic utilitarians; it merely deflects it. From a welfarist perspective, satisfying preferences is not valuable in itself; it is valuable only as a means to make people better off. So long as people make errors in hedonic forecasting, it is not at all clear that satisfying preferences actually increases experienced welfare.

[49] It is an extremely difficult descriptive empirical question whether even doctors who consciously seek to respond to patient wishes and see themselves as either exclusively providing information or at least engaging in what is usually referred to as some sort of collaborative, "shared" decision-making process actually effectively cede authority to patients, who may look to them to make what may inexorably seem like "expert" decisions. In our survey, virtually all of the physicians acknowledged that, at a minimum, they *recommended* one operation or the other, though it is not clear from this sort of limited survey whether, in the first instance, they "recommended" what they perceived the patient preferred after discussion and consultation and then, at the back end, how often their patients resisted recommendations (and how much they did to get them back on board when they did). For standard discussions of shared decision-making procedures in which doctors ultimately help patients reach views to which they clearly accede, see C. Charles et al., *Shared Decision-Making in the Medical Encounter: What Does It Mean? (or It Takes at Least Two to Tango)*, 44 SOC. SCI. & MED. 681 (1997); *see also* J. Slover et al., *Shared Decision-Making in Orthopedic Surgery*, 470 CLIN. ORTHOP. RELAT. RES. 1046 (2012).

[50] There are particular reasons in thinking about *distributive justice* to care more about the distribution of capacities or capabilities rather than either income or utility. Broadly speaking, it seems fetishistic to care about the distribution of income or particular resources, which are at core merely a means to some further end. Moreover, persons differ in their underlying capacity to transform any given set of resources into any relevant function. Thus, for instance, if our goal is to make two people equally able to get around, it might be more expensive for the person with atypical mobility methods to get around easily. It is also odd to care about the distribution of utility, though: the person who is dissatisfied with almost everything one gives him might then have claims on more resources until they made him as happy as the norm while those who are easily made content (or expect so little that they are happy to get whatever crumbs are made available) would have lesser claims, though all of these attitudes about what to make of the resources that one has been granted seem more the responsibility of the recipient than the provider. Moreover, systematic oppression may so dampen a group's expectations that they are content with a lesser lot. Justifying oppression because of adaptive preferences quite properly seems troublesome to many. Far fuller discussions of these points can be found, for instance, in SEN, *supra*, note 46; G.A. Cohen, *Equality of What? On Welfare, Goods, and Capabilities*, *in* THE QUALITY OF LIFE 9 (Martha Nussbaum and Amartya A. Sen eds., 1993); R. Dworkin, *What Is Equality? Part 1: Equality of Welfare*, 10 PHIL. & PUB. AFF. 185 (1981); and R. Dworkin, *What Is Equality? Part 2: Equality of Resources*, 10 PHIL. & PUB. AFF. 283 (1981).

It is difficult enough to figure out which capabilities are really central, and harder still to know how much weight to put on each when one must sacrifice, wholly or in part, one capability to achieve another. Each of the standard problems in implementing a capabilities-based approach seem especially salient in this context.

First, since key capabilities are defined at a very high level of generality, it is often difficult to tell whether (or at what level) the subject has the relevant capability.[51]

This all suggests, but surely does not entail, the possibility that when a doctor considers what service she is providing patients, she should think of herself as providing capacities to her patients more than providing particular resources or welfare levels. The obvious reason this discussion of the relevance of capacities to distributive ethics merely suggests, but does not entail, that result is that one could say that a patient is *entitled* to no more resources than he or she would require to reach the capacity level that distributive justice demands but that it would be improper to demand the patient select the treatment option that maximized his or her capacity rather than some equal- or lower-cost treatment that he or she thought better met his or her own needs or desires. It is not *unambiguously* improper either.

Think of the following case: *X* is *entitled* to $100,000 in medical care to ensure that he or she is free from a particular level of pain that we believe he or she is entitled to be free from, but would prefer to spend the $100,000 on wholly cosmetic plastic surgery that we believe is not needed to avoid social stigma that interferes in the same way with realizing life plans as pain does. Strong anti-perfectionists would doubtless bristle at the idea that being pain-free is somehow "more important" to this person's flourishing than looking the way he or she wants, but there are surely some who would argue that while it would be improper to override her desire to have the plastic surgery, our obligations to provide health care do not extend to elective plastic surgery.

The quick—but easily subject to critique—"analogy" is to voting: we distribute votes evenly to people in some significant part because we believe each of us has strong claims to participate in communal governance, just as we might distribute medical care because each has a strong claim to increase significant capabilities to the extent that cost-efficacious medical care can do so. But if a person would value some trinkets more than her ability to vote, or non-capacity—supplementing medical treatment more than capacity—increasing care, we are indifferent to her pleas; the basis for her distributive claim is *not* her claim to the utility level she could achieve if she cashed out all of her entitlements.

Even if we resolve this thorny issue in favor of subsidizing only capacity-increasing care, that still would leave open the question of whether an individual doctor who must make decisions for a patient should be trying to pick what the patient wants or pick what a party charged with allocating scarce medical resources would feel obliged to pick.

[51] One of the most developed of the lists of the capabilities that we should attend to is in M.C. Nussbaum, *Symposium on Amartya Sen's Philosophy: Five Adaptive Preferences and Women's Options*, 17 ECON. PHIL. 67 (2001). But when one looks carefully at Nussbaum's canonical list, one sees how difficult it is to apply to *distinct* states of ill health (precisely what we are facing in this case) or compromised physical power. Her capability list consists of the following: (1) *Life*. Being able to live a "normal" life span in a fashion that is preferable to a life "not worth living." (2) *Bodily Health*. Being able to have good health, including reproductive health and to be adequately housed and nourished. (3) *Bodily Integrity*. Being able to move freely from place to place; to be secure against violent assault; having opportunities for sexual satisfaction and for choice in matters of reproduction. (4) *Senses, Imagination, and Thought*. Being able to use the senses to imagine, to think, and to reason in a fashion sharpened by adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training; being able to use imagination and thought in connection with experiencing and producing works and events of one's own choosing, whether these works and events would best be described as religious, literary, musical, or artistic in some other way; being free to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise; and being able to have pleasurable experiences and to avoid non-beneficial pain. (5) *Emotions.* Being able to have attachments to things and to others; to love those who love and care for us; to grieve at their absence; to experience longing, gratitude, and justified anger; and not having one's emotional development truncated by fear and anxiety. (6) *Practical Reason.* Being able to form a conception of the good and to engage in critical

This is especially troublesome in cases like the THR/arthrodesis decision. It is certainly possible to say that experiencing severe pain not only directly deprives the subject of the capacity not to experience non-beneficial pain but, more importantly, perhaps, is so preoccupying that it effectively compromises the subject's ability to exercise several other critical capacities to a significant degree—forming a life plan, caring about the exercise of the imagination, taking part in activities, or participating in community life, for instance. But it is also possible to merely say that pain decreases utility levels although the subject is still exercising these other capacities while in pain. The same goes for immobility.[52]

Second, it is not clear whether either the capabilities of "functionings" that constitute well-being should be determined by the subject him or herself—if so, then the distinction between attending to capability rather than subjective preferences may attenuate considerably—or by reference to shared social norms.[53] If living without pain is a critical function only because it is critical by the subject's own lights, then it is not at all clear that we have done more than note that it is an end-state that the subject values and would likely choose.

Third, and most importantly, most forms of poor health can be said to compromise most of the patient's capabilities *somewhat*, but there is nothing to provide guidance in determining how severe the compromises are and to what extent a compromise in one area outweighs a gain in another.[54] Assume, for instance, that we believe both pain and immobility compromise health in some generic sense; that the risk of premature death and loss of the capacity to go from place to place freely is more an issue for those receiving THRs in adolescence than for those receiving an arthrodesis; that the limping associated with arthrodesis is more likely as a matter of fact to risk humiliation (and therefore potentially undermine valued forms of participation in the community); that arthrodesis is more likely to compromise opportunities for sexual satisfaction and reduce the likelihood of forming strong emotional bonds (to the uncertain

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reflection about the planning of one's life. (7) *Affiliation*. Being able to live with and show concern for others; to engage in various forms of social interaction; and to be able to empathize and imagine the situation of another (free assembly and political speech contribute to this, and protecting this capability entails protecting institutions that constitute and nourish such forms of affiliation, as well as protecting freedom of assembly and political speech); having the social bases of self-respect and non-humiliation; and being treated as a dignified being whose worth is equal to that of others (this entails that the subject not experience discrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, national origin or species). (8) *Other species*. Being able to live with concern for and in relation to animals, plants, and the world of nature. (9) *Play.* Being able to laugh and play and to enjoy recreational activities. (10) *Control over one's political and material environment.* Being able to participate effectively in governance, to hold property, and to gain meaningful employment on an equal basis with others. *Id.* at 87.

[52] Moreover, does being wheelchair-dependent in an imperfectly accommodating world compromise Nussbaum's "freedom to move from place to place?" Or is she referring only to more formal and full-blown restrictions on migration and the like? She mentions this capability as a subset of "bodily integrity" capabilities, but that hardly clarifies her meaning. *Id.* at 86.

[53] This ambiguity was highlighted by Sen himself. *See* AMARTYA SEN, THE STANDARD OF LIVING 30–31 (1985).

[54] Although one cannot exercise the other capacities if one is dead, it is by no means the case that even "life" has lexical priority over the other capabilities. One could of course risk dying prematurely (or even do something that makes premature death close to certain or certain) in order to exercise other capabilities that matter.

degree that these bonds are strongest in sexual relationships); that experiencing the serious, chronic pain that is likely to occur at some point prior to the conversion of a fusion to a THR is more likely to crowd out the exercise of any number of other capabilities (expressive, participatory, etc.). What do we do with all that conflicting and imprecise information if we are seeking to be capability-maximizers?

4. Hedonic Adaptation Does Not Imply That the THR is Superior

Assume we simplify the surgical choice and say that the basic bad outcome associated with THR is wheelchair-reliance in middle age and that the basic bad outcome associated with the arthrodesis is chronic pain that begins years after the operation and lasts for several additional years, until the patient is both old enough to get a THR that is likely to last as long as he or she is alive and has been in adequately severe pain for a long enough period to justify surgery. If we look at much of the classic literature on hedonic adaptation,[55] and look particularly at the literature as interpreted by disability rights advocates fearful that the lives of people with disabilities will be devalued by those allocating or rationing medical care,[56] as well as by disability rights scholars and tort

[55] Hedonic adaptation can most readily be defined and understood through analogy to sensory adaptation. Just as one first squints when exposed to bright light or first is bothered by a foul order but soon adjusts to the new ambient conditions, those who hedonically adapt soon treat what first seems exciting and fantastic or what first seems dismal and disheartening as the new normal, generating more or less the same level of happiness as one's old situation generated. *See* Shane Frederick & George Loewenstein, *Hedonic Adaptation*, *in* WELL-BEING: THE FOUNDATIONS OF HEDONIC PSYCHOLOGY 302, 302–03 (Daniel Kahneman et al. eds., 1999). There are several standard accounts of the inclusive-fitness evolutionary gains associated with hedonic adaptation. First, prolonged states of stress may cause health problems. *See* Robert M. Sapolsky, *The Physiology and Pathophysiology of Unhappiness*, *in* WELL-BEING: THE FOUNDATIONS OF HEDONIC PSYCHOLOGY, 453, 455–57 (Daniel Kahneman et al. eds., 1999). Second, hedonic adaptation permits people to focus prospectively on events that they can control. As Lucas puts it:

> First, threats that have persisted in one's environment for a long time are likely to be less dangerous than novel threats, and rewards that have persisted for a long time are less likely to disappear quickly than are novel rewards . . . . Second, if one's actions have yet to eliminate a threat or to lead to the attainment of a reward, then it becomes increasingly less likely that these actions will do so in the future. The reduced emotional intensity that accompanies hedonic adaptation allows people to disengage from unattainable goals and to focus their resources elsewhere.

R.E. Lucas, *Long-Term Disability Is Associated with Lasting Changes in Subjective Well-Being: Evidence From Two Nationally Representative Longitudinal Studies*, 92 J. PERS. SOC. PSYCHOL. 717, 718 (2007).

[56] Many have discussed the claim that the use of systems that more or less ration medical care to increase the number of quality-adjusted life years that medical care can achieve will harm disabled people if measures of a "quality-adjusted" year are based at least in some part on wrong-headed assumptions that years spent disabled are of low quality—a belief grounded not so much in the actual lived experiences of people with disabilities, but the fears, prejudices, and imperfect hedonic forecasts of the non-disabled population. High on the list of reasons that the non-disabled population misestimates the quality of disabled lives is the tendency to ignore hedonic adaptation. For discussions of this issue, see D. Brock, *Ethical Issues in the Use of Cost Effectiveness Analysis for the Prioritization of Health Resources*, 76 PHIL. & MED. 353 (2004); P. Menzel et al., *The Role of Adaptation to Disability and Disease in Health State Valuation: A Preliminary Normative Analysis*, 55 SOC. SCI. & MED. 2149 (2002); Philip G. Peters, *Health Care Rationing and Disability Rights*, 70 IND. L.J. 491, 534–36 (1995).

reformers who believe that juries will overestimate the pain and suffering that disabled plaintiffs experience when awarding damages for disabling torts,[57] then the choice between these two outcomes would be relatively clear.

In the eyes of those embracing the classic position on hedonic adaptation, people do not simply adapt much better than they would anticipate to wheelchair-reliance, but adapt quite well. Happiness levels following this disability and others will return to levels quite close to the equilibrium levels that existed prior to the loss of more conventional, accustomed mobility options after a short adjustment period.[58] On the other hand, one of the few negative experiences that persistently and continuously alters happiness is chronic pain.[59] If this literature, or interpretation of the literature, were correct, then it would seem that the potential bad hedonic consequences of the THR are illusory while the negative consequences of the arthrodesis are real. Were that the case, and were the patient properly focused exclusively or predominantly on his or her future hedonic states, the choice of surgeries here would thus be clear—THR would be the optimal choice.

It is also possible to argue—less starkly, but perhaps more convincingly—that even if people do not fully or nearly fully hedonically adapt to disability, they will radically overestimate the effects of disability when they make predictions about the hedonic consequences of wheelchair-reliance, in part because they underestimate the general capacity to adapt hedonically[60] that is in part grounded in internal intra-psychic

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[57] *See* Cass R. Sunstein, *Illusory Losses*, 37 J. LEGAL STUD. 157 (2008) (arguing that juries are likely to overestimate the impact of injuries on happiness so that civil-damage guidelines ought to be put into place to correct hedonic-judgment errors by jurors). For a similar argument, see John Bronsteen et al., *Hedonic Adaptation and the Settlement of Civil Lawsuits*, 108 COLUM. L. REV. 1516 (2008); *see also* Samuel R. Bagenstos & Margo Schlanger, *Hedonic Damages, Hedonic Adaptation, and Disability*, 60 VAND. L. REV. 745 (2007) (merging the disability rights and tort-reform literatures, and arguing that, when juries award hedonic damages to disabled plaintiffs, they bolster the socially counterproductive idea that people with disabilities live intrinsically poorer lives and distract both from the need to reform social practices to increase inclusiveness and to appreciate the adaptive capacities of people with different physical capacities. At the same time, awarding hedonic damages has the untoward effect of encouraging disabled plaintiffs in particular, and perhaps people with disabilities more generally, to see their lives as tragic).

[58] *See supra*, notes 55 and 57.

[59] Among the many standard pieces on the failure to adapt hedonically to chronic pain are M. Clare et al., *Coping and Adaptation to Facial Pain in Contrast to Other Stressful Life Events*, 59 J. PERS. SOC. PSYCHOL. 1040, 1050 (1990), and C. Graham et al., *Which Health Conditions Cause the Most Unhappiness?*, 20 HEALTH ECON. 1431, 1447 (2011). In fact, to the extent that scholars who argue that people adapt quickly and readily to changes in ability themselves (e.g., wheelchair-reliance, deafness, blindness) acknowledge that people with disabilities may be worse off hedonically than those without, they focus on the fact that disability is often accompanied by two conditions to which people do not adapt: chronic pain and ongoing uncertainty over future health states. *See* Frederick & Loewenstein, *supra* note 55, at 312. Some note further that people may not adapt to the prejudices they encounter and/or socially imposed limitations on activities, while also noting that those with disabilities are more typically vulnerable to pain, uncertainty, and heightened fear of premature death, though less certainly suffering from a sense that their well-being is more precarious and that it is difficult to be atypical, even if others are not prejudiced against those with statistically less typical traits. *See* David Wasserman & Adrienne Asch, *Understanding the Relationship Between Disability and Well Being*, *in* DISABILITY AND THE GOOD HUMAN LIFE 139 (Jerome E. Bickenbath et al. eds., 2014).

[60] For a classic discussion of the general role that the failure to account for hedonic adaptation plays in poor hedonic forecasting, see D.T. Gilbert et al., *Immune Neglect: A Source of Durability Bias in Affective Forecasting*, 75 J. PERS. SOC. PSYCHOL. 617, 638 (1998).

mechanisms.[61] But adaptation is also grounded in (equally unanticipated) changes in lifestyle. Persons who lose one physical capacity may, for instance, take up new activities or increase the frequency with which they engage in activities they rarely engaged in before the loss and find these activities are reasonable substitutes for those they no longer can do. Moreover, they are subject to focusing illusions when they consider the impact of salient life events.

For example, those who believe in focusing illusions argue that people overestimate the positive impact that moving to California will have on their happiness, because when they are asked to think of what the move will entail they focus solely on their affirmative reaction to the excellent weather, and ignore the fact that most of life will be just as it was before they changed the climate in which they lived.[62] In the same way, persons who lose one physical capacity will also come to recognize that much of life will remain unaffected by the disability. If this were true, then the fear of the immediate THR would largely reflect undue focusing on the highly salient outcome associated with the operation—wheelchair-reliance—compared to the more diffuse losses associated with the arthrodesis (chronic low-level pain, difficulty performing some self-help tasks).[63]

My strong belief is that the literature suggesting that the impact of wheelchair-reliance is likely short-lived while the impact of chronic pain persists is empirically unconvincing, wholly on its own terms, and conceptually muddled, in a wide range of ways. People simply do *not* adapt hedonically to the classic disabilities nearly to the extent that the authors of this conventional literature suggest.

Moreover, to the degree that people do adapt hedonically, they are still worse off, in any number of ways, some of which they are subjectively aware of and others of which nonetheless may matter whether or not they are subjectively aware of them. First, in terms of outcomes of which people are subjectively aware, it is unambiguous that changes in life circumstances often produce the expected positive and negative impacts on overall satisfaction if the satisfaction is measured *behaviorally* after the fact, not just *ex ante*. Assume that we observe that people actually seek to maintain seemingly favorable states (or continue to try to avoid unfavorable ones) which those who believe in hedonic adaptation say they should treat as of no moment. If this is the case, it is surely not merely a forecasting error that those seemingly favorable states are good or the unfavorable ones bad. Instead, it would appear that the subjective well-being reports are what are in error unless we believe that ongoing behavior is responsive to *persistent* misperception. Second, people may be subjectively unaware of negative changes that they would have meta-preferred not occur or, perhaps more controversially, that should furnish the basis of social judgments about outcomes. Declines in capabilities and

[61] The contrast between internal transformations and transformations in life activities is highlighted in Frederick & Loewenstein, *supra* note 55, at 302–03.

[62] D.A. Schkade & D. Kahneman, *Does Living in California Make People Happy? A Focusing Illusion in Judgment of Life Satisfaction*, 9 PSYCHOL. SCI. 340, 340 (1998).

[63] To the extent the hyper-focusing literature is persuasive, one might argue that adolescent patients struggle with competing (and perhaps offsetting) choice-making deficiencies. On the one hand, their myopia drives them towards the immediate THR; on the other hand, their focusing illusions drive them away from favoring that surgical choice.

alterations in the self may not cause hedonic shifts once these changes are persistently experienced—negative hedonic states may be present in the organism merely to motivate action when shifting conditions signal that improvement is plausible—but we might all think that lives are better-lived when lived by people with higher capability levels. This is true even ignoring the much-discussed and frightful possibility that people may hedonically adapt to *oppressive* limitations on their options.[64]

It is important when trying to understand the hedonic adaptation literature to avoid conflating "proof" of forecasting errors (underestimation of post-disability happiness levels) with proof of hedonic adaptation (the distinct claim that happiness levels after disability are as high as they were before). The canonical piece in the hedonic adaptation literature that ostensibly first demonstrated that lottery winners are no happier than accident victims rendered paraplegic actually shows no such thing, though it may lead readers to embrace the forecasting error claim.[65] Perhaps readers of the study typically make forecasting errors sufficient to make them *surprised* that the accident victims expressed better-than-neutral judgments of their subjective happiness levels, but the accident victims still reported significantly lower levels of happiness than did the lottery winners.[66] The study is also a bit of a methodological mess—both because its sample size is tiny and because cross-sectional studies like these are of little use—but, even taken on its own terms, it must be emphasized that it shows statistically significant differences and large effect size distinctions (d = .78) between the lottery winners and the accident victims.[67]

Most studies, following on the lottery winner/accident victim study, used the same suspect cross-sectional method that Brickman *et al.* used to demonstrate adaptation in studying adaptation to loss of limbs, paraplegia, dialysis, and bereavement over the death of a loved one. In each case, researchers surveyed a group of people who underwent the life event that would be expected to diminish reported happiness and compared those to reports by controls (the general population).[68] However, it would make considerably more sense to rely on ongoing large-sample *longitudinal* studies of happiness levels in a general population and measure the change in reported happiness levels in the subset of the sample that experienced the purportedly bad events, comparing these happiness levels to levels reported before the event.[69] In the cross-sectional studies,

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[64] There is, for instance, a rich literature dealing with the implications of empirical findings that women with low expectations of what their options ought to be are often reasonably satisfied with their low-capability lives. *See* S. Berges, *Why Women Hug Their Chains: Wollstonecraft and Adaptive Preferences*, 23 UTILITAS 72, 72–87 (2011); A. Levey, *Liberalism, Adaptive Preferences, and Gender Equality*, 20 HYPATIA 127, 127–43 (2005).

[65] *See* P. Brickman et al., *Lottery Winners and Accident Victims: Is Happiness Relative?*, 36 J. PERS. & SOC. PSYCHOL. 917, 923–24 (1978).

[66] *Id.*

[67] Among those who emphasize the puzzling popular understanding of the Brickman piece is Lucas, *supra* note 55, at 718, and Rick Swedloff & Peter H. Huang, *Tort Damages and the New Science of Happiness*, 85 IND. L. REV. 553 (2010). More generally, Swedloff and Huang are perhaps highest on the list of those who share my skepticism about the hedonic-adaptation literature. Their piece greatly helped me to clarify and consolidate many of my skeptical reactions.

[68] *See* Swedloff & Huang, *supra* note 67, at 556–57 (summarizing these cross-sectional studies).

[69] Even if one relies on cross-sectional studies of reactions to spinal-cord injuries, it appears more likely than not that disability does have lasting effects on satisfaction. For literature reviews, see M. Dijkers,

of course, pre-existing happiness levels are not known, and life events are not exogenous. This may lead to understating adaptation levels if those with lower lifetime happiness levels are more likely to undergo traumas.[70] But it may also lead to overstating adaptation levels. When researchers recruit people who have had the experiences they wish to study, those recruited may realize the purpose behind the study and over-report satisfaction because of demand characteristics.[71]

Those who have done longitudinal studies and compare reported happiness of the small sub-set of a large population that face disabling injuries or diseases typically find much slower and much less complete adaptation than those who study the issue in cross-sectional studies. In studies done by Richard Lucas, disability was associated with moderate to large immediate drops in happiness levels (with effect sizes ranging from .4 to 1.27 standard deviations) with little adaptation over time.[72]

The conceptual problems appear even worse. First, and perhaps most importantly, it is very difficult to specify all the aspects of experience that people value. Thus, even if people maintained the same level of one aspect of experience, such as happiness, it is not at all obvious that they would have maintained the same level of all valued experiences. Some of this problem is captured by commentators who believe that disabled people are worse off because the disabled may lack capabilities they once had, and that our judgments of overall life functioning blend judgments about "happiness" with judgments

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Quality of Life After Spinal Cord Injury: A Meta-Analysis of the Effects of Disablement Components, 35 SPINAL CORD 829, 829–40 (1997), and H. Livneh & E. Martz, *Psychosocial Adjustment to Spinal Cord Injury as a Function of Time and Injury*, 26 INT'L J. REHABIL. RES. 191, 191–200 (2003).

[70] *See e.g.*, V.L. Tye, *Psychosocial Adaptation of Children and Adolescents with Limb Deficiencies*, 2 CLIN. PSYCHOL. REV. 275, 276 (1992) (observing that children who lose limbs as a result of trauma, including accidents, had higher premorbid levels of psychological disorders than those children who lost limbs from illness).

[71] Lucas, *supra* note 55, at 719.

[72] Lucas followed 679 participants in one panel study for an average of 7.18 years before and 7.39 years after the onset of disability and followed 2,272 participants for an average of 3.48 years before and 5.53 years after onset. *See* Lucas, *supra* note 55. In prior longitudinal work, Lucas and co-authors found some substantial degree of adaptation by widows to the loss of a spouse, but the adaptation took eight years before it was nearly complete. *See* R.E. Lucas et al., *Reexamining Adaptation and the Set Point Model of Happiness: Reactions to Changes in Marital Status*, 84 J. PERS. & SOC. PSYCHOL. 527, 527–39 (2003). Similarly, contrary to much-cited cross-sectional work that found little evidence that income improvements for an entire population positively impacted happiness, longitudinal studies have found that income growth does increase happiness. *See* B. Stevenson & J. Wolfers, *Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox*, 1 BROOKINGS PAP. ECON. ACTIVITY 1 (2008). Some other longitudinal studies find higher levels of adaptation than Lucas finds, but still considerably less than one might expect reading the canonical hedonic-adaptation literature. *See* A.J. Oswald & N. Powdthavee, *Does Happiness Adapt? A Longitudinal Study of Disability with Implications for Economists and Judges*, 92 J. PUB. ECON. 1061, 1061 (2008) (finding that those with severe disabilities recovered 30% from their lowest reported levels of post-disability happiness and those with moderate disabilities recovered just 50%).

More generally, Lucas notes that there is considerable variability in responses to "bad" events: some individuals adapt far more quickly than others to the same life events. Lucas, *supra* note 55, at 728. For a similar argument emphasizing the need to study the more particular factors that influence the degree to which different people respond well or poorly to certain life events, see B. Headey, *The Set-Point Theory of Well-Being Has Serious Flaws: On the Eve of a Scientific Revolution*, 97 SOC. INDIC. RES. 7, 7–21 (2010).

about capability.[73] What is more striking is that even without reference to "objective lists" of *capabilities*, people's subjective conceptions of positive *affective* states are complex: Swedloff and Huang highlight one of the clearest examples,[74] noting that parents often do not "enjoy" care-taking activities, rating them low in terms of the pleasure they feel when caring for their children, but think of the activities as rewarding and contributing a great deal to life satisfaction.[75]

Second, there appears to be a substantial gap between behavior and self-reported subjective states that occurs not just *before* disabling events but after. It is not merely the case that people take steps to avoid disabling injury—that could, of course, be a result of a forecasting error. What is striking is that even people who claim that their happiness levels have not fallen below their pre-disability levels typically express a current desire to restore their prior physical functions. Thus, for instance, dialysis patients report little change in happiness, but they also express a willingness to give up half their remaining life to have normal kidney function[76] and colostomy patients, though reporting ordinary happiness levels, would on average give up nineteen months of life to return to pre-colostomy status.[77] This may be in significant part because they are willing to pay more (in money or lifespan) for things other than "happiness," but it may also be because self-reports of happiness do not even reflect what we enjoy.

The standard explanation for this phenomenon by believers in hedonic adaptation is that those who claim to be willing to give up a lot (whether in terms of lifespan or money) to be free from disability are once again suffering from a focusing illusion: questioning them about what they would give up to be free of disability makes them focus too narrowly on the single issue at stake and overestimate its impact on their lives as a whole.[78] But the real illusion, in my view, is that which besets believers in the focusing illusion. If Schkade and Kahneman were right that living in California does not make people happier even though focusing too much on the impact of weather makes them think that they will be, why do the people who move to California not take advantage of above-normal increases in housing prices, cash out, and go back to Ohio? If people are simply deluded when they predict that getting out of Northern winters to vacation in warm weather will make them happier, why do they keep going back year after year? It is one thing to argue that they got it wrong the first time, that *ex ante*

[73] These judgments may be instantiated in jury judgments that tortfeasors who cause plaintiffs to be disabled have injured them. One of the chief proponents of this position is Cass Sunstein. Sunstein, *supra* note 57, at 176–81. For an interesting, critical summary of the notion that disability may seem unfortunate because it undermines capabilities, see Wasserman & Asch, *supra* note 59, at 149–61.

[74] Swedloff & Huang, *supra* note 67, at 561. See also their more general discussion of the fact that many things, independent of emotions, matter to people. *Id.* at 571.

[75] See M.P. White & P. Dolan, *Accounting for the Richness of Daily Activities*, PSYCHOL. SCI. 1000, 1006 (2009) for empirical support for Swedloff and Huang's observations.

[76] G. Loewenstein & P.A. Ubel, *Hedonic Adaptation and the Role of Decision and Experience and Utility in Public Policy*, 92 J. PUB. ECON. 1795, 1799 (2008).

[77] D.M. Smith et al., *Misremembering Colostomies? Former Patients Give Lower Utility Ratings than Do Current Patients*, 25 HEALTH PSYCHOL. 688, 691 (2006).

[78] *See* Sunstein, *supra* note 57, at 172.

predictions are mistaken, but it is quite another to say that they never learn anything at all from their experience.[79]

C. Survey of Physician Recommendations for THR and Arthrodesis

If the choice between THR and arthrodesis were an easy one, one would expect very high levels of consensus among physicians asked to recommend one or the other procedure. If, though, the choice is difficult, in part because of factual uncertainty (about both medical outcomes and the impact of distinct medical outcomes), and because decision-makers with disparate evaluative schemas will choose differently, then we would expect not only that there is no full-blown consensus on bottom line recommendations but that distinctions in factual beliefs and values would impact recommendations. This is precisely what I found when, along with five co-authors, two of whom were academic orthopedic surgeons, I conducted a survey of members of the Pediatric Orthopedic Society of North America and the American Association of Hip and Knee Surgeons.[80]

Respondents were asked to recommend THR or arthrodesis[81] in four clinical vignettes. Vignette 1 presented the base case of an eighteen-year-old male of normal

[79] It strikes me as more plausible, though a proper subject for others to research, that when people are asked to report on overall levels of "happiness" they tend to respond with the same mildly positive answers in large part because the question subtly demands a response that emphasizes existential uncertainty: How could anything that is or is not going on in my life impact what I think of my life on the whole? How could I care about any *events*? Must there not be something more fundamental and less contingent about the nature of my life? Isn't the right general attitude towards life that it is good, if for no other reason than because it seems worth preserving against death, the only alternative? And when one uses the preferred method of today's hedonic researchers—moment-by-moment assessment of how one is reacting to what is happening *right now*—people invariably give too little consideration to happiness-dampening or happiness-enhancing chronic states, let alone states that increase more complex forms of life satisfaction. Subjects asked to give moment-by-moment assessments are typically asked good/bad approach/avoidance questions: Would you like whatever is happening now to persist or to stop, or are you indifferent? Do you judge your current state as good or bad? For a discussion of the relatisonhip between approach/avoidance and good/bad judgments, see Daniel Kahneman, *Objective Happiness*, *in* WELL-BEING: THE FOUNDATIONS OF HEDONIC PSYCHOLOGY, 3, 7–9 (Danil Kahneman et. al. eds., 1999). It is unlikely that people treat these prompts as asking them to record themselves as ruminating, or that it would even be accurate to say that one's sole activity at many times *is* simply ruminating. But at which moment in the day, precisely, would one tend to record one's sadness at being unable to hold a child safely if a disability had that result? Moment-by-moment assessment is also far better at capturing the frequency of good, bad, and neutral experiences—which, in a given day, are likely to be routinized across persons—and a far poorer job capturing the emotional depth and intensity of experiences.

[80] Some of the results of the survey are reported in M. Kelman et al., *The Choice Between Total Hip Replacement and Arthrodesis in Adolescent Patients: A Survey of Orthopedic Surgeons*, 31 J. ARTHROPLASTY 70 (2016). Others are reported for the first time in this paper. I cite to the original piece in cases where the data has been previously reported but not in cases where it is being reported for the first time.

[81] We directed respondents to make a recommendation, even if it would not be their normal practice to recommend one operation over another rather than to help facilitate patient decision-making simply by giving information about expected outcomes. Nonetheless, it is interesting to note that, as a matter of fact, our respondents believe that they do and should have a good deal of input into the decision. Only 9.1% of respondents agreed with the statement that they never recommend one procedure to a patient over another,

weight. The patient presented with end stage unilateral hip arthritis resulting from avascular necrosis of the femoral head following an unstable slipped capital femoral epiphysis occurring at age fifteen. All conservative measures had been exhausted. The patient had difficulty performing Activities of Daily Life (ADLs) and suffered significant pain during a typical school day. [82] The patient was the child of college graduates who himself expected to attend a four-year college and have a sedentary occupation.

The subsequent vignettes varied one feature of the base case, specifically: the patient was overweight (Vignette 2), female (Vignette 3), and presumed to be destined for an occupation involving manual labor (Vignette 4). The survey also elicited respondents' attitudes to the risk–benefit and time trade-offs involved in the treatment choice, as well as responses to questions about the degree to which they were directive of patient decision-making rather than attempting to do no more than give patients information to help them make their own choices. We asked questions about respondents' factual views and normative attitudes on a number of contested issues. We also attempted, largely unsuccessfully, to ascertain how often they actually performed each sort of operation, in part to determine whether there was a substantial gap between what they recommended when confronted with vignettes and what they did in practice when confronted with similar real-life cases, and in part to determine if their recommendations might be based solely on experience and, perhaps, concomitant competence in performing each operation.

In the base case (Vignette 1), there is a fairly high degree of consensus that the THR is the right choice, but nothing close to unanimity. Of 672 surgeon respondents to this vignette, 79% recommend THR.[83] The proportion that recommends THR in Vignette 3 (female patient) rises modestly to 85%,[84] but the level of consensus that the THR is the correct choice drops rather considerably in Vignette 2 (high BMI patient)—only 66% recommend THR.[85] What is most striking is that in Vignette 4 (patient likely to do manual labor), only 39% recommend THR, 38% recommend hip arthrodesis, and 22% are neutral.[86] Even if one believes that there is adequate surgical consensus that THR is the default medically-appropriate choice for non-myopic "normal" patients, one would be hard-pressed to argue that this is the case for higher BMI patients, who most typically present with a slipped capital femoral epiphysis, and even more so for patients likely to engage in manual labor.[87]

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whereas 91.4% of respondents agreed with the statement that they talk with patients to help clarify risks and best outcomes before making a recommendation.

[82] To clarify, the patient in the vignette has severe hip pain that prevents him from doing ordinary daily activities. The pain developed after the tip of the femur (thighbone) slipped backward off the neck of the bone and dislocated from the hip, resulting in significant arthritis in the joint. The patient's condition has not improved from non-surgical treatment.

[83] Kelman et al., *supra* note 80 at 72.

[84] *Id.*

[85] *Id.*

[86] *Id.*

[87] The changes in responses across the vignettes reflect the widespread, but not universal, belief that the expected outcomes of each operation vary with patient characteristics. In discussing uncertainty, in Part II (A)(1), *supra*, I addressed the question of whether these beliefs are consistent with available evidence. Suffice it to say that at least some physicians believe each of the following propositions: (a) the THR is more likely to require revision if the patient is heavier or if he engages in substantial physical activity, as a

The problems with the surgeon acting as the decision-maker is addressed later in Part III B(1).What is more germane in demonstrating that distinctions in evaluative schema impact the choice between THR and arthrodesis is that the responses that the surveyed surgeons gave to attitude questions strongly influenced their recommendations. Most notably, surgeons who believed that function in young adulthood was a priority over function later in life had radically lower odds of recommending arthrodesis (base case: OR=0.09, 95% CI, 0.03-0.25).[88] The fact that surgeons' expressed factual beliefs and normative attitudes, as well as other fixed traits (like age) that doubtless impact these attitudes and beliefs, have an effect on their recommendations can be seen in a number of other ways as well. For example, respondents were asked how long they believed, on average, a hip implanted in the years 1977, 2000, and 2020 would last before requiring revision. We constructed a proxy variable (the "technological optimism" variable) based on the degree to which a respondent believed a 2020 implant would last longer than a 2000 implant. Interestingly, those who are technologically optimistic (i.e., have above-mean estimates of the number of years a 2020 implant will last relative to a 2000 implant) are only 38.6% as likely to recommend arthrodesis as those who have below-mean estimates ($p < .01$).

One of the most striking (but murky) results of our findings was that fewer doctors recommend arthrodesis in response to vignettes than one might expect given their responses to attitude questions. Most strikingly, 185 of the 705 surveyed physicians agree or strongly agree with the statement that most suggests support for arthrodesis: "The risk of being wheelchair-bound or crutch dependent in middle age if a THR revision fails is substantially more severe than the deficits associated with arthrodesis that will be experienced by the patient as a younger adult." Yet only sixty-eight of these respondents strongly or weakly recommend arthrodesis in the base case.

Perhaps even more surprising, there is a profile of responses to multiple attitude and fact questions which would seem to strongly drive respondents to recommend arthrodesis. Physicians with this profile agree (strongly or weakly) with the aforementioned statement that the risk from a failed revision is more severe than the deficits associated with arthrodesis, also agree that there is a real trade-off in choosing one operation rather than the other, but disagree with the statement that trade-offs should be resolved in favor of improving functioning while young, and also disagree that physicians should pick THRs because bad results might not occur while gains from them are certain. Only thirty-seven respondents had this profile, and they indeed recommended

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manual laborer would be expected to. Thus, the risk of immobility in middle age rises in Vignettes 2 and 4 from whatever one believes its base rate to be and, in the minds of some of the physicians, rises above some unarticulated threshold level at which the immediate THR still seems to be the preferred operation; (b) women experience more bad effects from the arthrodesis than do men, so that it is clearer that women should choose the THR at a level of risk of immobility in middle age at which it that would make it appropriate for men to choose the arthrodesis. These purported gender effects may be social (women could be thought by some physicians to be more adversely affected by limping than men, in terms of forming relationships and/or succeeding in the labor market), and they may be physical (women are thought by some physicians, perhaps with little justification, to be more likely after a fusion operation to have more difficulty than men with urination and sexual activity and to have difficulty giving birth vaginally).

[88] Kelman et al., *supra* note 80, at 73, 75.

arthrodesis at much higher rates than other respondents, though 30.8% of respondents with this profile did not recommend arthrodesis in the base case.

The more important point is that this mix of attitudes *radically* alters physician recommendations: 69.2% recommended arthrodesis in the base case compared to 6.5% of the 477 respondents who did not have this profile of responses ($p < .001$). Respondents were even more radically likely to recommend arthrodesis to female patients than those without this profile: 46.2% compared to 3.5% ($p < .001$).

The survey confirms both my argument that the choice between arthrodesis and total hip replacement is difficult and that it is difficult both because of factual uncertainty about the projected physical outcomes of each operation and because those who must choose between the operations evaluate distinct outcomes differently.

III. DECISION-MAKING COMPETENCE CHALLENGES

It is possible, of course, that while the THR/arthrodesis decision is *difficult*, we can trust particular decision-makers to make it in a fashion that meets the genuine long-term interests of the adolescent patient. The next Part considers the three logical candidates to fill the decision-making role: the adolescent him or herself, the patient's parents or guardians, and the physician. This Part explores serious problems that result from remitting the decision to each of these possible decision-makers.

A. Adolescent Patients as Decision-Makers: the Problem of Adolescent Myopia

1. General and Situation-Specific Competence

The decision between THR and arthrodesis could be left to the adolescent patient him or herself, taking pains to ensure that the patient learns all that is known about the probabilistic distribution of outcomes expected to result from each surgical procedure. This might seem best for wholly instrumental reasons: the patient is best-positioned to make the utility-maximizing choice both because the patient will care most about doing what is in his or her own interest and because the patient has unmediated access to his or her own evaluative preferences. It might also seem best if we have non-instrumental reasons to allow people to make decisions about their own health care, as this is surely an arena in which non-instrumental autonomy concerns are often deemed important.[89] Assuming that heterogeneous decisions are appropriate given both transparent distinctions in objective circumstances[90] and distinctions in tastes, consumer sovereignty certainly seems like the reasonable default, particularly if the problems of communicating

[89] These values are deemed important by many commentators who make the straightforward argument that patient wishes should be respected even when others would make contrary decisions that would better serve patient interests. *See* R. Gillon, *Ethics Need Principles—Four Can Encompass the Rest—and Respect for Autonomy Should Be First Among Equals*, 29 J. MED. ETHICS 307, 310 (2003). Some medical ethicists abjure what they see as the "simplistic" liberal autonomy view in which one respects a patient's autonomy simply if one responds to his or her first order preferences, arguing instead that truly autonomous persons (including patients) must reflect on and identify with their particular set of goals. *See e.g.*, A.M. Stiggelbout et al., *Ideals of Patient Autonomy in Clinical Decision-Making: A Study in the Developments of a Scale to Assess Patients' and Physicians' Views*, 30 J. MED. ETHICS 258 (2004).

[90] That is to say, the probability of each outcome varies with patient characteristics.

the technical information about surgical outcomes—that patients would typically not be able to acquire without a physician's aid—can be overcome.

The presumption that the adolescent should decide would be called into question if we believed him or her "incompetent" to make the decision. Typically, though, those in mid-to-late adolescence are almost surely *not* incompetent to make medical decisions in the simple sense that a small child would be incompetent. Unlike a small child, they are readily capable of understanding the consequences of the decision. By the time adolescents reach the age at which this particular surgical decision is most often made, they are almost surely *cognitively* competent to make this decision. They will understand the causal relationships between their decisions and outcomes and how to avoid logical or reasoning errors. They will understand the concept of risk and what it means to choose a course of behavior that may (but may not) result in bad outcomes though, like adults, they may make distorted judgments about risk, and their judgments may in some ways be even more distorted.[91]

To the degree that some argue that adolescents make "bad" choices or are thought incompetent to make choices that match up with the choices they would reaffirm over the course of their lives (particularly choices to engage in various forms of "risky" health-jeopardizing and sexual behavior), it does not appear to be a function of shortfalls in their understanding of the consequences of their actions. From the age of fifteen on, adolescents are almost invariably immune from the "personal fable."[92] More generally, they use the same rational algorithms in decision-making as adults do.[93] They are well aware of the risks that they are taking when they make risky decisions and understand not only in an abstract sense that certain actions or settings are "risky" but recognize that behavior may have adverse concrete consequences outside the lab.[94]

If adolescents understand causal relationships and reason perfectly well, why might we nonetheless worry that they are "incompetent?" In discussing adolescent myopia below, in Part III(A)(3), I address the possibility that their priorities are not just different, but are unlikely to be ones that they would reaffirm later in life. So, for instance, in the "distinct priorities" view of what makes adolescents different, they might understand as well as adults precisely how risky it is to have unprotected sex, but they simply value heightened physical pleasure or sexual spontaneity more than adults do. The view that adolescents are myopic implies that they simply care little about how their

[91] *See, e.g.*, V.F. Reyna & F. Farley, *Risk and Rationality in Adolescent Decision Making: Implications for Theory, Practice, and Public Policy*, 7 PSYCHOL. SCI. PUB. INT. 1, 5–6 (2007).

[92] Those immune from the "personal fable" understand that the same laws of nature that apply to people generally apply to them as well.

[93] The canonical literature noting that there is little growth in the logical abilities relevant to decision-making after mid-adolescence includes W.F. OVERTON, *Competence and Procedures: Constraints on the Development of Logical Reasoning*, *in* REASONING, NECESSITY, AND LOGIC: DEVELOPMENTAL PERSPECTIVES 1 (1990), and S. Hale, *A Global Developmental Trend in Cognitive Processing Speed*, 53 CHILD DEV. 653, 659–60 **(**1990); *see also* M.J. Quandrel et al., *Adolescent (In)vulnerability*, 48 AM. PSYCHOL. 102 (1993) (finding that even at-risk adolescents consider themselves no less relatively vulnerable to a range of bad outcomes than do adults, confirming typical findings that adolescents have fully developed logical capacities).

[94] *See, e.g.*, Mary J. Rotherbamn-Borus & Cheryl Koopman, *AIDS and Adolescents*, *in* ENCYCLOPEDIA OF ADOLESCENCE (Roger J. R. Levesque ed., 1990).

adult-self evaluates any state of affairs; the view that myopic choices could be considered "incompetent" is in turn grounded in the idea that competent choices are those that are more likely to be stable and survive reflection.

1. Not All Defects in Adolescent Decision-Making Are Germane to the THR/Arthrodesis Choice

Before discussing the possibility that adolescents simply have distinct evaluative schemes that will prove unstable, it is necessary to discuss why I reject the relevance of a different set of concerns about adolescent competence. There are a familiar set of concerns that adolescents may be incompetent, not because they are illogical, but because they lack a number of other features associated with having acceptably mature judgment. In these alternative views, what adolescents lack, most particularly, is clarity of identity and the capacity to make independent judgments, reasonably free from peer pressure; the perspective to see how one's decisions affect others (including oneself in another temporal context); and the ability to stay judgment until they have evaluated a situation deliberately, and to thereby act less impulsively or more prudently (at least when faced with decisions that cause particular sorts of intra-personal conflict).[95]

Psychologists looking at a range of prototypically "bad" adolescent decisions—from decisions to drink, abuse drugs, smoke cigarettes, commit crimes, to decisions to have sexual relations unprotected from the risk of pregnancy and/or sexually transmitted diseases (STDs) or sexual relations that "merely" compromise emotional well-being—have tried to identify ways in which adolescent decision-making capacity is still under-

[95] Psychologists who have emphasized that juveniles may be less culpable than adult offenders have tended to underscore the notion that juveniles may lack the capacity that they will have as adults to control antisocial behavior, even when their ability to reason is fully developed, because they lack these sorts of "maturity" capacities. *See, e.g.*, E. Cauffman & L. Steinberg, *(Im)maturity of Judgment in Adolescence: Why Adolescents May Be Less Culpable Than Adults*, 18 BEHAV. SCI. & L. 741 (2000); L. Steinberg et al., *Are Adolescents Less Mature Than Adults? Minors' Access to Abortion, the Juvenile Death Penalty, and the Alleged APA Flip-Flop*, 64 AM. PSYCHOL. 583 (2009); L. Steinberg & E.S. Scott, *Less Guilty by Reason of Adolescence: Developmental Immaturity, Diminished Responsibility and the Juvenile Death Penalty*, 58 AM. PSYCHOL.1009 (2003).

The normative force of the literature is probably more ambiguous than its authors imply, even if it is all descriptively valid. It might well be the case that the average adolescent suffers from infirmities of decision-making capacity compared to the average adult, but the literature does not demonstrate (and almost certainly could not demonstrate) that adolescent criminals have poorer decision-making capacity than adult criminals. The normative argument that adolescent criminals are less responsible is typically presented, at first blush, as an argument grounded in their incapacity. But what *distinguishes* them from adult criminals, if anything, is almost surely not their incapacity but the fact that their incapacity may be temporary. It is certainly possible to argue that not just dangerousness, presumably of more interest to an incapacitation-focused policymaker than a blame-focused retributivist, but culpability is diminished if a defendant manifests antisocial tendencies that may disappear later in life; but making that argument requires a good deal more work than the authors typically commit. That is true in part for normative reasons: our general resistance to punishing status rather than conduct arguably entails a commitment to judging whether an *act* is culpable, given the actor's mental state and capacity to control *that particular act*, not whether the actor is more globally culpable as a person. It is also true because it seems to entail the rather perverse implication that if we came to know more about each individual's neuro-development, we might then justly blame those adolescents we confidently projected would continue to manifest impulsivity as adults but not blame those who will mature in a more statistically typical fashion.

developed. There are interesting questions about whether the standard lists of infirmities accurately describe adolescent judgment, whether the infirmities of judgment they highlight "explain" the observed risky behavior, and whether certain infirmities are more salient than others. But in discussing the particular THR/arthrodesis decision, I think the far more significant point is that it seems unlikely that the problems typically emphasized in these discussions are in fact strongly at play.

So, for instance, many psychologists have argued that adolescents are unduly subject to peer pressure to engage in health-compromising behaviors. The standard explanation for sensitivity to peer pressure is that adolescents have yet to form an adequately robust sense of self and identity and are hyper-sensitive to social bonding cues. [96] But if there are any peer pressure effects pushing adolescent patients to choose the THR imprudently, they are likely extremely attenuated. Certainly, no peers will be present at all when the decision is made—this is not the iconic band of kids shoving a cigarette or a joint in the adolescent decision-maker's face and mocking him or her for his or her infantile refusal to grow up and try one. If there are untoward peer influences at all, they are quite indirect: the adolescent patient may conceivably focus too much on the negative reactions of peers to the visible disabilities associated with the arthrodesis, but in the immediate decision-making context, surrounded only by guardians and physicians, his or her reference group is entirely adult.

Still others argue that adolescents are strong reward- and sensation-seekers (which sounds an awful lot most like a *preference* distinction, though one where psychologists typically add on a causal account of the preference) who have not yet developed the capacity for self-regulation (which seems more like a *capacity* shortfall).[97] Thus, the

[96] Use of intoxicants by peers is highly predictive of whether a particular adolescent uses intoxicants. *See* Laurie Chassin et al., *Adolescent Substance Uses*, *in* HANDBOOK OF ADOLESCENT PSYCHOLOGY 665, 679–80 (R. M. Lerner & Laurence Steinberg eds., 2d ed. 2004). Adolescents with sexually active peers (or with peers whom they believe to be sexually active) are more prone to be sexually active themselves. *See, e.g.*, S. Babalola, *Perceived Peer Behavior and the Timing of Sexual Debuts in Rwanda: A Survival Analysis of Youth Data*, 33 J. YOUTH ADOLESC. 353, 358–61 (2004); F.A. DiBlasio & B.B. Benda, *Gender Differences in Theories of Adolescent Sexual Activity*, 27 SEX ROLES 221, 224–25, 231 (1992). Adolescents commit a higher proportion of crimes in groups than do adults as well (though this may be in some part because they spend more time in groups than do adults). *See* Franklin Zimring, *Kids, Groups and Crime: Some Implications of a Well-Known Secret*, 72 J. CRIM. L. & CRIMINOLOGY 867 (1981). They are even significantly more likely to have auto accidents when peers are present in the car, though whether this is due to distraction or increased risk-taking is hard to know, although simulation driving games indicate that atypical risk-taking by adolescents surrounded by peers is critical. *See* B. Simons-Morton et al., *The Observed Effects of Teenage Passengers on the Risky Driving Behavior of Teenage Drivers*, 37 ACCID. ANAL. PREV. 973 (2005). One of the standard neuro-psychological explanations for heightened peer sensitivity is that adolescents are more oxytocin receptive than adults and that oxytocin receptivity plays a key role in social bonding, increasing recognition of and memory of social stimuli. *See* L. Steinberg, *A Social Neuroscience Perspective on Adolescent Risk-Taking*, 28 DEV. REV. 78, 89–91 (2008). More technical explications of Steinberg's point can be found in J.N. Ferguson et al., *The Neuroendocrine Basis of Social Recognition*, 14 CURR. OPIN. NEUROBIOL. 248 (2004), and T.R. Insel & R.D. Fernald, *How the Brain Processes Social Information: Searching for the Social Brain*, 27 ANNU. REV. NEUROSCI. 697 (2004).

[97] See, *e.g.*, B.J. Casey et al., *The Adolescent Brain*, 28 DEV. REV. 62 (2008), for a fairly standard account of this view: limbic reward systems are well-developed in adolescents, but top-down prefrontal control systems have not yet matured. Casey et al. are not atypical in rejecting the account that sub-optimal adolescent decision-making is largely a result of impulsivity per se, noting that impulsivity decreases

"plus" sides of unprotected sex, intoxicants, and crime are especially appealing at that time of life, while the capacity to balance these gains against the losses is underdeveloped.[98] Because this account is heavily "medicalized," even the "distinct desires" side of the equation tends to be given a developmental–biological causal interpretation.

One common causal account is that changes in dopaminergic activity, particularly increased sensitivity of the dopaminergic system, around puberty leads adolescents to seek positive sensations that they would value less both earlier and later in life.[99] At the same time, this attraction to sensation occurs before self-regulatory systems buffer the tendency to value the positive aspects of risky behavior so highly: the standard evolutionary biological account of this mixture of traits is that adolescents, in order to separate from their families of origin, *must* seek positive outcomes and pay little attention to downside risks.[100]

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linearly from childhood on (with the development of the ventral prefrontal cortex) and that younger children, though more impulsive, are less likely than adolescents to engage in suboptimal behavior. (The argument seems unpersuasive: younger kids may lack desires for some of the classic sub-optimal choices—e.g. in the sexual realm—and lack the opportunity or physical ability to make others—e.g. drive recklessly). Though some psychologists indeed attribute "bad" decisions to impulsivity—and adolescents may well be impulsive relative to adults—impulsivity alone cannot explain many of the sub-optimal decisions that they make. Impulsivity is subtly but significantly distinct from having a short time horizon. It refers less to preferences for the present self and more to the inability to align choices with any set of preferences because one makes snap decisions. Thus, for instance, a standard way of coding impulsivity is to ask subjects to describe themselves on a five-point Likert scale in response to the question, "I do things without giving them much thought." *See* Cauffman & Steinberg, *supra* note 96, at 748–49. For arguments that adolescents are indeed impulsive, see L. Steinberg, *Risk-Taking in Adolescence: New Perspectives from Brain and Behavioral Science*, 16 CURR. DIR. PSYCHOL. SCI. 55 (2007).

[98] A typical behavioral finding consistent with this view is that adolescents are as good as adults at learning to play with decks of cards that generate larger rewards than alternative decks, but are slower to learn to avoid those decks that generate larger losses. This can be interpreted as finding that adolescents are more approach-oriented than avoidant. *See* E. Cauffman et al., *Age Differences in Affective Decision Making as Indexed by Performance on the Iowa Gambling Task*, 44 DEV. PSYCHOL. 193 (2010).

[99] In one view, discredited in the opinion of some developmental psychologists, adolescents sought pleasure because they suffered from something akin to a dopamine deficit and sought high-reward experiences because they attain less appetitive value from a variety of stimuli relative to individuals at other ages. For an exemplar of this view, see L.P. Spear, *The Adolescent Brain and the College Drinker: Biological Basis of Propensity to Use and Misuse Alcohol*, 14 NEUROSCI. BIOBEHAV. REV., J. STUD. ALCOHOL SUPPL. 71 (2002). The contrary view that adolescents are not seeking higher-reward activities because they are inadequately receptive to more typically rewarding activities, but that they seek reward because they are more sensitive to rewards is explored in a number of studies, summarized in Steinberg, *supra* note 97. Some of the key studies include those made by N.L. Dumont et al., *Transient Dopamine Synthesis Modulation in Prefrontal Cortex: In Vitro Studies*, 150 DEV. BRAIN RES. 163 (2004); M. Ernst et al., *Amygdala and Nucleus Accumbens Activation in Response to Receipt and Omission of Gains in Adults and Adolescents*, 25 NEUROIMAGE 1279 (2005); D. Rosenberg & D. Lewis, *Postnatal Maturation of the Dopaminergic Innervation of Monkey Prefrontal and Motor Cortices: A Tyrosine Hydroxylase Immunohistochemical Analysis*, 358 J.COMP. NEUROL. 383 (1995).

[100] There is the standard litany of evolutionary stories—perhaps "just-so stories" to skeptics—to explain adolescent risk proclivity, and particularly risk proclivity among males: risk-seeking leads to dominance displays by males that are advantageous in terms of sexual selection, and risk-taking more generally is needed on the savannah because risk-avoidance proves more dangerous than not. Steinberg, *supra* note 96 at 87–88. Moreover, there are similar evolutionary stories to explain why adolescents should be more peer-referential—they need to separate from their family of origin—and more novelty-seeking (separation

While it is possible that reward-seeking declines among adults, what is arguably more powerful is that the development of higher-level cognitive control functions among young adults improves decision making. There is considerable cognitive development through the middle of adolescence: declining grey matter and synaptic pruning permit the major developments in basic information processing and logical reasoning[101] that lead to the aforementioned conclusion that adolescents "understand" and reason about medical decisions as well as adults do.[102] What typically does not occur as dramatically until one's twenties is myelination and increase in white matter:[103] this shift has some consequences of little importance to decreased risk-taking (e.g., improvement in spatial working memory)[104] and some consequences that are quite significant, improving response inhibition[105] and the capacity to compute expected values when negative events are of distinct magnitudes and frequencies (a capacity associated with the ventromedial prefrontal cortex).[106] The core argument made by those contending that adolescents reason well but make poor judgments is that adolescents' socio-emotional network is activated while their cognitive control networks are disrupted: in the "competition" between systems favoring risk or immediate reward and those favoring deliberation, cognitive control systems prevail more often among adults, in part simply because affective and cognitive reactions are better integrated.[107]

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requires love of the unfamiliar) and risk-seeking. *See* Casey et al., *supra* note 98, at 70–71. In the words of Casey et al.: "[A]dolescence is the period in which independence skills are acquired to increase success upon separation from the protection of the family. . . . You need to engage in high-risk behavior to leave your family and village to find a mate . . . ." *Id.* at 70.

[101] D.P. Keating, *Cognitive and Brain Development*, *in* HANDBOOK OF ADOLESCENT PSYCHOLOGY 45 (R. Lerner & L. Steinberg eds., 2d ed. 2004). For a fuller literature summary, see T. Paus, *Mapping Brain Maturation and Cognitive Development During Adolescence*, 9 TRENDS COGN. SCI. 60 (2005).

[102] *See* notes 92-95 and accompanying text.

[103] J.N. Gredd et. al., *Brain Development During Childhood and Adolescence: A Longitudinal MRI Study*, 2 NAT. NEUROSCI. 861 (1999) (myelination); R.K. Lenroot et al., *Sexual Dimorphism of Brain Developmental Trajectories During Childhood and Adolescence*, 36 NEUROIMAGE 1068, 1069 (2007) (white matter development).

[104] *See* H.M. Conklin et al., *Working Memory Performance in Typically Developing Children and Adolescents: Behavioral Evidence of Protracted Frontal Lobe Development*, 31 DEV. NEUROPSYCHOL. 103, 251 (2007).

[105] B. Luna et al., *Maturation of Widely Distributed Brain Function Subserves Cognitive Development*, 13 NEUROIMAGE 786, 791–92 (2001).

[106] E.A. Crone & M.W. van der Molen, *Developmental Changes in Real Life Decision Making: Performance on a Gambling Task Previously Shown to Depend on the Ventromedial Prefrontal Cortex*, 25 DEV. NEUROPSYCHOL. 251 (2004).

[107] For a summary of the literature taking this view, see Steinberg, *supra* note 96, at 96. His bottom-line position is well-stated:

> The temporal gap between the development of basic information-processing abilities, which is facilitated by maturation of the prefrontal cortex and largely complete by age 16, and the development of abilities that require the coordination of affect and cognition, which is facilitated by improved connections among cortical regions and between cortical and subcortical regions . . . is a later development.

Id. at 97. This is also what lies behind the view taken by proponents of this picture of development that adolescents are competent to decide to have abortions without parental consent but not fully responsible for criminal behavior. The argument (convincing or not) is that the decision to have an abortion, unlike many

Once more, though, even if this broad picture of adolescent deficits is accurate, it is unlikely that adolescents would manifest *this form* of incompetence in making the decision between a THR and an arthrodesis, given the character of risk- and reward-seeking cognitive evaluation that adolescents typically demonstrate. While the gains from the THR do come *sooner*, they hardly come immediately; the ill effects of an arthrodesis, most particularly pain, are typically delayed for decades after the operation. Moreover, they are hardly the sorts of gains we would associate with sensation-seekers, both because they are not immediate pleasures *and* because they are not so much simple pleasurable sensations as subtly better "ways of life." The literature arguably implies that sensation-seeking adolescents would be expected to be *less* pain averse than adults, and lower levels of pain aversion might be expected to dampen, rather than increase, the degree to which they shunned the arthrodesis.[108] The decision to have the THR might in

(if not all) decisions to commit crimes, is not made in the presence of social-pressuring peers or made impulsively but made after deliberation, and is not immediately gratifying in a sensory sense. *See* Steinberg, *supra* note 96, at 586.

[108] Data on the relative prevalence of painful, but not dangerous, self-harm among adolescents and adults—particularly cutting, which appears to be a predominantly female activity, but also actions like head-banging—is not as reliable as would be ideal, in part because of conceptual problems in defining the behavior. For a discussion of some of the measurement issues, see K.L. Gratz, *Measurement of Deliberate Self-Harm: Preliminary Data on the Deliberate Self-Harm Inventory*, 23 J. PSYCHOPATHOL. BEHAV. ASSESS. 253 (2001). Nonetheless, it seems that the activity is far more prevalent in teens: typical estimates are that 4% of adults engage in non-suicidal self-harming behavior compared to roughly 15% of teenagers and 17–35% of college students. *See* J. Briere & E. Gil, *Self-Mutilation in Clinical and General Population Samples: Prevalence, Correlates, and Functions*, 68 AM. J. ORTHOPSYCHIATRY 609, 616 (1998) (4% of general population engages in self-harming behavior); E.D. Klonsky et al., *Deliberate Self-Harm in a Nonclinical Population: Prevalence and Psychological Correlates*, 160 AM. J. PSYCHIATRY 1501, 1507 (2003) (4% of surveyed population engaged in the behavior); A. Laye-Gindhu & K.A. Schonert-Reichl, *Nonsuicidal Self-Harm Among Community Adolescents: Understanding the "Whats" and "Whys" of Self-Harm*, 34 J. YOUTH ADOLESC. 447, 447–48, 491 (2005) (noting a wide range of estimates of prevalence rates in the literature and finding a 15% prevalence rate in the authors' study with rates among females three times those of males); E. Lloyd-Richardson et al., *Characteristics and Functions of Non-Suicidal Self-Injury in a Community Sample of Adolescents*, 37 PSYCHOL. MED. 1183, 1184, 1188 (2007) (noting wide range of estimates of prevalence but finding 46.5% rate in the surveyed high school population); J.J. Muehlenkamp & P.M. Gutierrez, *Risk for Suicide Attempts Among Adolescents Who Engage in Non-Suicidal Self-Injury*, 11 ARCH. SUICIDE RES. 69, 74 (2007) (demonstrating that 23.2% of adolescents reported non-suicidal harming behavior, with female rates higher than male rates).

There are a host of other problems in determining whether those who cause pain to themselves are in any significant ways "sensation seekers," and whether or not adolescent and adult self-harmers come from the same populations (self-harm in adults might, for instance, be more typically co-morbid with other, more serious psychological disorders, especially depression). There is no real settled account of the functions that self-harming serves. While there is only modest support for the notion that "sensation-seeking" is in and of itself a significant (self-reported) motivation for most who harm themselves, it is not clear that sensation-seeking is not a common mechanism to achieve further goals that many psychologists believe motivates self-harming behavior (regulation of negative affect—ending periods of dissociation where the subject is anxious, "feels nothing," and is thus disconnected). For a discussion, see E.D. Klonsky, *The Functions of Deliberate Self-Injury: A Review of the Evidence*, 27 CLIN. PSYCHOL. REV. 226 (2007). Finally, though, it is not clear that even adolescent self-harmers would actively embrace (or even fail to disdain) the sort of externally imposed nagging pain that arthrodesis patients chronically and ultimately endure if given the choice to experience. Nonetheless, if it were true (as it appears to be) that cutting is largely an adolescent activity, it might, at least, loosely suggest that adolescents might, along the pain-avoidance dimension, be *more* prone to choose the arthrodesis than they would be when older.

some sense be described as riskier—it entails a low probability of what might seem a poorer outcome—but once more, this hardly looks like the sort of risk-seeking that characterizes adolescent daredevils. There cannot, for instance, be any aspect of sexual display of bravado in the risk-seeking aspect of the decision. While it may resemble the risk-acceptance of those who smoke, there is no action course providing immediate pleasure that entails the possibility that something awful will happen either right away (an accident, arrest) or in the relatively short run (pregnancy, an STD).

Some researchers question the across-the-board assumption that an atypically high number of adolescents engage in risky behavior because they are more prone to seek sensation or less prone to override short-term desires in order to avoid bad consequences or to seek (known) risks actively or avoid uncertainty (ambiguity aversion). They favor instead the simpler notion that myopia or impatience is what drives most risk-seeking behavior.[109] Typically, what a "risk-seeking" adolescent risks is not a less-than-certain bad outcome in the present or immediate future, but a less-than-certain bad outcome in the distant future: the adolescent may appear to be risk-seeking, then, even if he or she is actually simply discounting the utility of future selves. Because there are few situations in which distant bad outcomes are sure to occur, we get few test cases which fully dissociate risk-preferences and myopia. However, what makes me skeptical of the account that adolescent risk-taking is solely a function of myopia is that it seems to be present even in the risky-driving cases where the uncertain losses will be borne immediately if they are borne at all.

But whether one believes that myopia, risk-proclivity, impulsiveness,[110] or exaggerated susceptibility to peer influence drives any number of the classic "bad" decisions, it seems clear to me that the decision to have a THR, if thought of as imprudent, is imprudent predominantly because it is driven by myopia.

3. Myopia

It remains a complex normative question whether myopic tastes should be respected—even if they reveal dynamic inconsistency[111]—that I will not engage with

[109] *See, e.g.*, M. Sutter et al., *Impatience and Uncertainty: Experimental Decisions Predict Adolescents' Field Behavior*, 103 AM. ECON. REV. 510–11 (2013) (presenting experimental evidence that adolescents who exhibit shorter time horizons—that is to say, greater impatience—engage in higher levels of risky activity. For instance, they were more likely to spend money on alcohol and cigarettes, more likely to have a higher BMI, less likely to save money, and more likely to commit violations of a school's code of conduct, while subjects who were either less risk-averse or ambiguity-averse did not display a pattern of conventionally risky behavior). *See also* M. Castillo et al., *The Today and Tomorrow of Kids: Time Preferences and Educational Outcomes of Children*, 95 J. PUB. ECON. 1337, 1383–84 (2011) (demonstrating that less patient children have less favorable school-performance outcomes).

[110] A subject is "impulsive" if unable to engage a deliberative process when faced with a compelling socio-emotional positive cue.

[111] The classic discussion of dynamically inconsistent choices is given by R. Strotz, *Myopia and Inconsistency in Dynamic Utility Maximization*, 23 REV. ECON. STUD. 165 (1955). If I would require a higher interest rate to defer consumption from year zero to year one than I would to defer consumption from year 50 to year 51, then my choices are dynamically inconsistent. Assume, for instance, that I would choose $100,000 now over $125,000 a year from now but accept $125,000 in year 51 over $100,000 in year 50. Many people find these choices intuitively plausible and even find more extreme variants plausible: many think it seems reasonable to pick one apple today rather than two tomorrow, while no one

here.[112] Suffice it to say that the limiting case for many people is that an adolescent's decisions would be unworthy of respect if he or she treated his or her fifty-year-old self as almost wholly "other," with only a limited sense that the fifty-year-old self's concerns were his or her own. He or she might be said to put no (or nearly no) weight on the utility of his or her fifty-year-old self, or, in what strikes me as the more plausible alternative formulation, have so little ability to imagine him or herself at fifty that his or her abstract utility-weighting scheme is of little practical significance because he or she never concretizes his or her image of a low-utility middle-aged instantiation of him or herself.[113] One might be wary of decisions made by this sort of decision-maker if one believes he or she would typically later renounce those preferences and that only stable preferences should count or because one simply believes that the temporal order in which we inexorably make behaviorally salient decisions (always future regarding) ought not to affect our judgments of the welfare consequences of respecting preferences in which each

would say it is reasonable to pick one apple in a year over two in a year and a day. Dynamic inconsistency arises if deferred consumption is chosen for the distant period but, when the choice is reconsidered in fifty years, the subject chooses not to defer consumption. I have never been convinced that these sorts of dynamic inconsistencies (or non-exponential discount rates) result from the who-gives-a-hoot-about-my-fifty-year-old-self form of myopia that concerns me in thinking about the surgical choice here (or that would concern me in thinking about whether people save enough or worry enough about diseases they risk getting much later in life). If it is true that the difference between today and tomorrow is much greater perceptually than the difference between a year from now and a year and a day from now, one might observe distinct discount rates that have nothing to do with indifference to the future self. One thinks one is answering the question "do you want more rather than less" in the delayed case, while only in the immediate case does deferred gratification even figure into the equation.

[112] It *is* important to note that there is no necessary connection between the recognition that a decision-maker is using a defective process and the belief that his or her decision is *wrong*. I note, in the fairly narrow context of differentiating the THR–arthrodesis choice from the choice to commit suicide, that while it seems likely that adolescent patients will be "infected" by myopia, it is still likely the case that the myopic decision happens to be the stable one as well. But there is a broader conceptual point to be made. The fact that a decision-making process is non-ideal is simply a separate question from the question of whether the decision generated by the process is imprudent, unstable, or otherwise questionable. One way we know this is to note that each of two binary, mutually exclusive choices could be reached at least in substantial part through "process error," and yet they cannot each be equally wrong. Take an example raised by Koszegi and Rabin: A pregnant woman's advance directive to forego anesthesia during child birth would almost surely be significantly affected by what is usually referred to as projection bias, the failure to appreciate her reaction to pain when she is not in pain (parallel to the inability of people to predict what they will want to eat once hungry when they are not hungry). If suspect decisional provenance equated to mistaken judgment, we would then ignore the advance directive. On the other hand, that same advance directive to decline the anesthetics would protect against decisions made during labor that are significantly a function of poor self-control, leading us to ignore the in-the-moment pleas in favor of the earlier directives. *See* Botond Koszegi & Matthew Rabin, *Revealed Mistakes and Revealed Preferences*, *in* METHODOLOGIES OF MODERN ECONOMICS (Andrew Caplin & Andrew Schotter eds., 2008).

[113] These two formulations may actually not be conceptually distinct. There is neuroscientific evidence, for instance, that people who discount the future more highly are those who feel less connected to their future selves and that thoughts of the future self typically activate brain regions associated with making judgments about the interests of others. *See* H. Ersner-Hershfield et al., *Saving for the Future Self: Neural Measures of Self-Continuity Predict Temporal Discounting*, 4 SOC. COGN. AFFECT. NEUROSCI. 85 (2009).

temporally separated "self's" views are entitled to equal weight in constructing a utility function even if none is stable over the course of the life cycle.[114]

The operative question, though, is whether it is best to see adolescent decision-making in this context as possessing enough features that resemble the limiting case—future self of no normative moment or no ability to picture the future self in any particular state—that we should think of decision-makers here as seriously deficient. There are good reasons, though hardly overwhelmingly persuasive ones, to believe that people generally—not just adolescents—treat distant future selves as strangers. One way of assessing this claim is to first describe typical distinctions in the way people treat others in the present and how they treat themselves and then to assess whether the way in which they treat their future selves more closely resembles the ways in which they treat others rather than the ways in which they treat their current selves. So, for instance, we typically think that the bad things that occur to others are a product of their personalities while the bad things that happen to us can be explained by context and situation.[115] Furthermore, when we visualize others, we see them from our own perspective but our own presence in the scene is erased, while when we attempt to visualize ourselves, we visualize the surroundings we are in.[116] There is substantial experimental evidence that when asked to think about future selves, we attribute events in the future self's life to persistent character rather than context, just as would if thinking about others.[117] Similarly, we visualize the future self as an object of our gaze, as we would envision another person in the present.[118]

Even if people generally, and perhaps adolescents in particular, did not treat the future self as strangers, it is still seemingly the case that their views of their future selves are considerably more abstract and general (i.e., the future "self" merely has some general traits I describe myself as having) rather than specific and concrete.[119] The judgments made for the future self may thus correspond to the wishes that seem to make sense for the abstractly-imagined self but may make considerably less sense for the pragmatic self who is considerably more interested in attending to his or her more specific wants and specific situations.[120]

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[114] The middle-aged self may be myopic looking backward so that his or her view of the prudent decision might well underestimate the importance of the experiences he or she has already had; thus, the fact that a decision is renounced is not sufficient to condemn it in this view.

[115] Support for these propositions is set out in E. Pronin & L. Ross, *Temporal Differences in Trait Self-Ascription: When the Self Is Seen as an Other*, 90 J. PERS. SOC. PSYCHOL. 197 (2006). Incidentally, the authors believe that the two traits I have highlighted are related. In their view, people attribute their own failures to context in part because they envision themselves in context while, when they focus on others, they envision only their gaze at the individual.

[116] *Id.* at 206

[117] *Id.*

[118] *Id.*

[119] This view of the ways in which people represent future selves, in more abstract terms, is laid out well in N. Liberman et al., *The Effect of Temporal Distance on Level of Mental Construal*, 38 J. EXP. SOC. PSYCHOL. 523, 525–26, 529–30 (2002) (objects envisioned in the future are categorized more generally and preferences about distant events are organized around and expressed in terms of simpler structures), and C.J. Wakslak et al., *Representations of the Self in the Near and Distant Future*, 95 J. PERS. SOC. PSYCHOL. 757, 758 (2008) (the distant self is typically represented abstractly and ascribed highly general traits).

[120] Y. Kivetz & T.R. Tyler, *Tomorrow I'll Be Me: The Effect of Time Perspective on the Activation of Idealistic Versus Pragmatic Selves*, 102 ORGAN. BEHAV. HUM. DECIS. PROCESS. 193 (2007). Kivetz and

Often, of course, we surreptitiously judge the quality or prudence of decision-makers by looking at the quality of the decision, conflating substantive and procedural defenses of paternalistic interference.[121] However, it will surely not be easy to judge the commonplace decision to get the THR in the same way that we might judge obviously substantively awful decisions to commit suicide or, absent objective indicia of rising income capacity, the substantively unwise decision by borrowers to ignore foreclosure risks when agreeing to loans with steeply escalating interest rates or balloon payments.

In a sense, then, we are left with a more abstract procedural question: to what extent would it be accurate to say that adolescents can neither imagine themselves as middle-aged nor care much about what the life of their scarcely-imagined future self will be like, at least *in this context*? Adolescents plainly make decisions that objectively increase the well-being of their future selves—e.g., they invest in the acquisition of human capital, and many forego activities that jeopardize future health—but this cannot settle the question of whether they can imagine or care about their futures. In making these sorts of seemingly future-regarding decisions, they may not be dominantly motivated by a desire to protect their future selves. Students may instead work hard in school, for instance, not so much because they imagine a better distant future, facilitated by studying, but because they get approval now (from parents, teachers, or relevant peers) or because, given the ways they were raised, they cannot really imagine not doing so. Similarly, they may not smoke not to protect their middle-aged self from disease but because smoking has a social connotation they abjure or because they know, fairly abstractly, that it is "unhealthy," and they are generically committed to doing healthy things.

I suspect, though, that if given the freedom to make the choice between the THR and arthrodesis, adolescents will seriously consider choosing the arthrodesis only if they genuinely and authentically empathize with a far older version of themselves. Adolescents will likely choose the arthrodesis if they picture that older self's life and concerns in enough detail to assess the impact of very particular outcomes, and, finally, take that person fully seriously. Unlike in the human capital acquisition and smoking cases, there are no social norms or signaling opportunities here to support the choice that

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Tyler argue that when thinking about the long-term, people express idealistic goals that correspond to very general positive self-images; but when thinking about concrete near-term goals, they are more prone to consider pragmatic concrete features of their selves and their situations. Thus, for instance, students thinking about selecting a professor in the long run desire that the professor treat them with respect. Making a decision for the immediate future, though, they are more prone to seek out a professor who gives out a lot of high grades. *Id.* at 198–200.

[121] I have argued that it is nearly impossible to avoid this in many cases: while preference utilitarians extol only informed and prudent decisions, it is difficult to ascertain whether a subject has adequate information about the future consequences of his or her decisions or whether he or she is adequately prudent if he or she makes bad choices. Is it really *procedurally* suspect to make choices when in a "hot" or "aroused" state—e.g., to shop for food when hungry, to decide whether to have sex/unprotected sex when sexually aroused—or are those just substantively bad choices? One could imagine that "hot" choices are the ones made when one is most engaged by the relevant issue (is it too abstract to think about what food I want when I am not hungry?). For a fuller discussion, see Kelman, *supra* note 48, at 395–97.

promotes the objective interests of the future self. So, if they are not *internally* motivated by a non-myopic lifetime utility function, the arthrodesis will be off the table.[122]

There is a fair deal of evidence that adolescents have a higher discount rate than adults do,[123] but I do not think the literature demonstrating this is especially helpful for my purposes. First, researchers studying this issue often elicit discount rates over moderately short periods,[124] not the thirty-plus year periods of concern here, and there is no reason to believe either that the thirty-year discount rate is as low as the simple compound rate for a short period.[125] Second, it is not clearly the case that subjects do (or should for that matter) discount future utility and future income in the same way, so that information typically gathered about financial discount rates for adolescents may be of little moment. [126] To put that point more generally, there are good reasons to believe that

[122] There is another way of getting at much the same point. When thinking about distant selves, people typically think of these selves in only the most abstract and general terms and seek to meet only the needs or desires of that future self that can be framed in highly general and abstract ways. Thus, they may reject smoking because they would like to be "healthy" in some generic way or save money because they would like to "have a middle-class lifestyle." What they do not do well is make decisions that they must make in order to attend to more minute details of their lives—for example, examining what it might be like to be "unhealthy" or "restricted" in the far more particular ways that they must assess in order to make sensible trade-offs between pain and incapacity to do some routine activities (stair-climbing or donning socks) during early adulthood and wheelchair-reliance at a still later stage of life. For a rather full account of the way in which people think about the future self's interests in terms of very general and simple goals while assessing the interests of proximate selves with far greater particularity, see Liberman et al., *supra* note 119.

[123] The most extensive study of this is L. Steinberg et al., *Age Differences in Future Orientation and Delay Discounting*, 80 CHILD DEV. 28 (2009) (finding that adolescents demand a return to delayed consumption that is lower than that demanded by children, but higher than that demanded by adults, and that this comes largely from attitudinal differences—the extent to which adolescents prefer short- to long-term goals—rather than either distinctions in impulsivity or cognitive distinctions—the degree to which they think about the future). Others have also found higher-than-adult but lower-than-child discount rates among adolescents. *See, e.g.*, L. Green et al., *Discounting of Delayed Rewards: A Life-Span Comparison*, 5 PSYCHOL. SCI. 33, 35 (1994); A. Scheres et al., *Temporal and Probabilistic Discounting of Rewards in Children and Adolescents: Effects of Age and ADHD Symptoms*, 44 NEUROPSYCHOLOGIA 2092, 2098 (2006).

[124] *See* Steinberg et al., *supra* note 123 at 34 (testing discounting for periods of one day, one week, one month, three months, six months, and one year). However, Green et al. *supra* note 123, at 134, elicit discount rates for periods as long as twenty-five years.

[125] One of the most powerful reasons that even a teen, who may demand no more than an adult would to delay consumption for a week, might demand far more to delay consumption for twenty years is that twenty years into the future feels more distant for a teen than twenty years would feel for an adult, precisely because it *is* a much higher proportion of his or her life span. *See* W. Gardner, *A Life-Span Rational-Choice Theory of Risk Taking*, *in* ADOLESCENT RISK TAKING 66 (N.J. Bell & R.W. Bell eds., 1993).

[126] One commonplace normative account of inter-temporal discounting of experiences is that the ideal rational agent often discounts income and commodities but discounts the value of future experiences only to the more limited extent needed to account for (a) the risk of dying, (b) the inability to store memories of earlier experiences, and (c) losing his capacity to enjoy an identical experience as much later in life. Future utility is not itself rationally discounted. *See, e.g.*, J. Broome, *Discounting the Future*, 20 PHIL. & PUB. AFF. 128, 128–33, 137–42 (1995). Arguments that it makes sense to discount one's own future utility, rather than to demand more goods or, even more obviously, more money in exchange for foregoing goods or money now, depend significantly on finding it plausible that future selves are significantly "other" in a fashion most strongly suggested by Derek Parfit, who argues that it is at least rationally defensible that our connection to past and future selves is merely a matter of the contingent degree to which we recall the past

discount rates are rather domain-specific: that is, a person who saves for the future may nonetheless discount future health states or vice versa.[127]

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self and share intentions with the future one. *See* DEREK PARFIT, REASONS AND PERSONS (1984), and for his more particular views on the non-necessity of caring for one's future self, see D. Parfit, *Personal Identity*, 89 PHIL. REV. 2 (1971). One should be indifferent between a trip to Paris in fifty years and one today except to the extent that (a) you may not live for fifty years; (b) you will have fifty years of remembering Paris if you go now that may be hedonically superior to anticipating your trip to Paris for fifty years; and (c) there is, at best, a risk, and at worst, a firm belief that you will grow increasingly anhedonic with age. More generally, there is little reason to believe that we should treat time discounting and time preference the same way: we may discount future events in the sense that we care less about some future consequence because the fact that the consequence occurs in the future may alter its expected utility (e.g., it might not occur, one's tastes might change).

What it means to have a true time preference is that we prefer immediate utility gains over later gains of equal magnitude. This point is emphasized in S. Frederick et al., *Time Discounting and Time Preference: A Critical Review*, 40 J. ECON. LITERATURE 351, 352 (2002). Even time preference itself, they argue, may be a function of psychological factors that can be readily dissociated and may not co-vary: a pure preference for the present over the future, impulsivity (acting in an unplanned, spontaneous fashion), compulsivity (sticking with plans), and inhibition (the ability to inhibit knee-jerk responses to appetites and emotions that may trigger impulsivity). *Id.* at 392.

On the other hand, every rational subject should plainly prefer $1,000 now to $1,000 in fifty years (even assuming away inflation) because there is a real rate of return to invested capital, so that even if one were indifferent between the goods one would purchase with $1,000 now and those goods purchased later, one would have *more* goods later if one waits. In fact, of course, if capital markets are perfect (so that the money amounts one might receive at different points in time can be costlessly exchanged for money amounts at an earlier or later time at a specified interest rate), then the choice between different monetary outcomes can be reduced to selecting the reward with the greatest net present value, given the prevailing interest rate. (If the interest rate is 10%, you would be nuts not to take $1 now over $1.05 in a year since you could turn the $1 now into *more* than $1.05 next year; on the other hand, if offered $1.20 next year, you could convert that to a bit more than $1.09 now, so it would be unfathomable to reject the offer to receive that much money in the future even if one valued only the utility you enjoyed right now.) Broome emphasizes this point in *Discounting the Future*, *supra*, at 137–38. This point was also emphasized in, among other places, Richard F. Meyer, *Preferences over Time*, *in* DECISIONS WITH MULTIPLE OBJECTIVES 473, 485–86 (Ralph Keeny & Howard Raiffa eds., 1976).

[127] *See* G.B. Chapman et al., *Familiarity and Time Preferences: Decision Making About Treatments for Migraine Headaches and Crohn's Disease*, 5 J. EXP. PSYCHOL. APPL. 17 (1999); G.B. Chapman & A.S. Elstein, *Valuing the Future: Temporal Discounting of Health and Money*, 15 MED. DECIS. MAK. 373 (1995). Similarly, though perhaps for distinct reasons (e.g., distinctions in impulsivity) there appears to be low and often statistically insignificant levels of correlation between time preference as traditionally measured by eliciting money-discount rates and behaviors that are thought to be impacted by time preference—e.g., smoking, taking on credit card debt, seat belt use, exercise frequency, getting dental check-ups. (There were low correlation levels among these behaviors as well). *See* VICTOR FUCHS, *Time Preferences and Health: An Exploratory Study*, *in* ECONOMIC ASPECTS OF HEALTH 93, 110–11, 115 (1982). However, there is evidence that smokers have flatter wage profiles than non-smokers, implying (if weakly) that they are less prone to delay consumption by investing in human capital. *See* L. Munasinghe & N. Sicherman, *Why Do Dancers Smoke? Smoking, Time Preference, and Wage Dynamics*, 32 E. ECON. J. 595, 596, 600–07 (2006). Similarly, heroin addicts seem to have higher discount rates, though it is not easy to tell whether short time horizons cause use or whether use shortens time horizons, and if it is the latter, whether it does so by compromising cognitive function or by changing rational reactions to what is inevitably a less certain future. *See* N.M. Petry et al., *Shortened Time Horizons and Insensitivity to Future Consequences in Heroin Addicts*, 93 ADDICTION 729 (1998).

I have a great deal of trouble interpreting these findings. The fact that some smokers save a lot does not really tell us that those smokers are *not* future-oriented with regards to health even though they *are* with regards to money: the decision to smoke is determined not *only* by future orientation, but by, for

I think the discount rate studies are of less interest than suggestive findings that adolescents are typically unable to project themselves into the distant future, to engage in what is usually referred to as "temporal extension"[128] to a significant degree, that they do not think about or consider the distant future,[129] or that they do not believe there is a link between one's current decisions and future well-being.[130] There is a rich literature that argues, first, that people make decisions to realize wanted and avoid unwanted versions only of the "possible selves" that they can imagine;[131] and second, that the middle-aged self is invisible to the adolescent decision-maker, that the possible selves the adolescent envisions project out by, at most, roughly a decade, focusing almost entirely on career, marriage, and parenthood.[132]

There is a huge problem with this literature, though, from the vantage point of establishing with any degree of confidence that adolescent patients will ignore the interests of their middle-aged self or be unable to imagine that self in the surgical decision-making context at issue here. Psychologists usually study adolescents whose actual decisions merely impact the relatively short-term future in the first instance and impact the distant future as a by-product of more immediate effects. An adolescent who thinks most about him or herself as married (or worries about remaining unmarried) might be doing so because he or she must attend to what he or she should do to get married in the next ten years. Similarly, if the adolescent is motivated by thoughts of what his or her possible self should do to get a good first or second job, then the

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instance, susceptibility to peer influence or ads or nicotine-sensitivity. They might smoke still more, or have started smoking even earlier in life, but for their future orientation.

[128] The concept of temporal extension seems to have been raised first in E. Lessing, *Extension of Personal Future Time Perspective, Age and Life Satisfaction of Children and Adolescents*, 6 DEV. PSYCHOL. 457 (1972).

[129] Adolescents who rarely consider or think about the future lack what has been referred to as "time perspective." *See* Cauffman & Steinberg, *supra* note 96, at 748. For a similar point, see J.E. Nurmi, *Planning, Motivation, and Evaluation in Orientation to the Future: A Latent Structure Analysis*, 30 SCAND. J. PSYCHOL. 64, 70 (1989).

[130] The notion that adolescents who generally understand cause-and-effect relationships discount or ignore the connection between their decisions and future well-being is raised in C. Somers & T. Gizzi, *Predicting Adolescents' Risky Behaviors: The Influence of Future Orientation, School Involvement and School Attachment*, 2 ADOLESC. FAM. HEALTH 3 (2001).

[131] The foundational work is H. Markus and P. Nurius, *Possible Selves*, 41 AM. PSYCHOL. 954 (1986), exploring the fact that people think about selves they would like to become, selves they could become, and selves that they fear becoming. Generally speaking, the selves we fear are selves we have experienced rather than merely imagined. *See* D.M. Ogilvie, *The Undesired Self: A Neglected Variable in Personality Research*, 52 J. PERS. SOC. PSYCHOL. 379, 379–80 (1987). These selves motivate action: for instance, one may try to take steps to avoid becoming selves one fears or take steps that might realize selves one would like to become. More generic possible selves are likely less motivating than more particularized self-regulating selves; thus, for instance, envisioning oneself avoiding distractions and studying may do more to induce studying than envisioning the self as a college graduate, which may merely engender positive feelings. *See* D. Oyserman et al., *Possible Selves as Roadmaps*, 38 J. RES. PERS. 130, 133–34, 144–46 (2004).

[132] That young people envision only proximate possible selves is emphasized not just in the early work by Markus but can be seen in later work as well. *See, e.g.*, S. Cross & H. Markus, *Possible Selves Across the Life Span*, 34 HUM. DEV. 230, 237–41 (1991) (most adolescents hope for unrealistically successful possible selves compared to even mildly older people and focus on relevant future selves—success at school, getting married).

adolescent is not only attending both to everything he or she has any real present control over but is also actually attending to the distant future through indirect means. If a late adolescent *did* think about being married or financially secure at age fifty, steps that late adolescent takes that refer only to his or her thirty-year-old self would be the most relevant anyway: whether one married while still young and what early adult jobs one obtained. It is not at all clear that in the relatively rare cases in which adolescents face decisions without any short-term consequences that they would not be able to imagine possible selves in the distant future; it is simply the case that the distant self is not ordinarily relevant to the tasks and decisions they actually face. Under some plausible accounts of how "possible selves" in fact motivate behavior, possible selves will motivate when information about specific behaviors (means to achieving a goal) are accompanied by information about important goals.[133] This may *generally* not be the case for adolescents thinking about the distant future,[134] but may well be the case when an adolescent faces the particular surgical choice between a THR and arthrodesis.

The bottom line is that it remains quite plausible that adolescents are almost wholly incapable of imagining their middle-aged selves at all, and it is not clear that they would typically then attend to that self's interests even if they could imagine it.[135] But the existing literature does not firmly prove that they are thoroughly myopic in this way when faced with a decision, like the THR/arthrodesis choice, in which the long-term future is essentially all that is directly at stake when facing the concrete decision.

B. Adult Decision-Makers: Surgeons and Parents

1. Problems with Surgeons as Decision-Makers

It may well be the case that as a matter of descriptive fact, surgeons will typically either make the THR or arthrodesis treatment decision or play a substantial role in shaping patient decisions. Patients may ask, in the majority of cases, what the surgeon him or herself would do, and surgeons may typically respond to the question. The surgeon's view may prove extremely weighty if not determinative, especially in situations in which patients do not have a realistic option of avoiding intrusive treatment altogether.[136] The model surgical decision nowadays is made through what is generally referred to as "shared decision-making"—a process in which the doctor provides information in a more user-friendly form than was traditionally offered about outcomes

[133] *See* R.H. Hoyle & M.R. Sherrill, *Future Orientation in the Self-System: Possible Selves, Self-Regulation, and Behavior*, 74 J. PERS. 1673, 1676–77, 1679–80 (2006).

[134] Generally speaking, temporally distant events are construed in abstract and general terms, though they are often goal-oriented, while events (and in all likelihood possible selves) in the near future are construed in concrete and specific terms, though in less goal-oriented terms. *See* Y. Trope & N. Liberman, *Temporal Construal*, 110 PSYCHOL. REV. 403 (2003).

[135] I suspect, too, but found no decent supportive or contradictory literature, that adolescents are also far more prone than adults to exaggerated technological optimism about the relatively distant future, that they are more prone to believe that *any* medical problem that will arise by the time they reach middle age will be soluble. I would doubt, though, that this distortion is as universal among adolescents as the serious myopia I am worried about here, even if it exists.

[136] More than 90% of the doctors we surveyed share a bottom-line recommendation with patients, at least if asked. But I have no information about the proportion of patients who ask for more than purely factual outcome information.

and the range of options and, at the same time, works to elicit patient values.[137] Physician and patient in a sense collaborate to make the best decision from the patient's perspective: the doctor is neither paternalistic nor a mere passive source of information flowing unidirectionally to the patient since he or she is expected to learn from the patient too about the patient's values and uncertainties.[138] Shared decision-making appears especially desirable when one of the realistic treatment options is considerably less invasive (e.g., watchful waiting on early stage prostate cancers).[139] Plainly, though, the degree to which we should feel comfortable with the patient directing care decisions—and what we mean when we say that a patient is "directing decisions" given the manipulability of the choice conditions—might well depend on the degree to which we trust the patient to make prudent, self-interested decisions.

Surgeons might be more trustworthy than myopic patients if underlying prudent patient preferences were homogenous or if surgeons had honed their abilities to discern relevant differences between patients that might permit them to induce what each patient's prudent preference would be. In many ways, the procedure I ultimately recommend we follow in this setting would direct surgeons to look for such relevant differences, and then, alternatively, use conventional sorts of nudges and penalty defaults to induce all-but-insistent patients to make the choice consistent with the choice the doctor believes prudent for someone with his or her traits or to provide information and discussion of the traits that lead the doctor to conclude that one choice is prudent, rather than to provide merely medical outcome and surgical risk information.

But simply directing the surgeon to do what he or she thinks best—without systematizing the exploration of the value conflicts at stake here—is likely to lead to an indefensible system in which the treatment each patient receives turns on the wholly irrelevant traits of the surgeon the patient happens to see. We might well think, for instance, that a patient should be allowed to make the decision to get a THR that expresses his or her belief that getting established in life as a young person on the best possible footing is critical, because once one establishes a basic status (with or without a romantic partner, with or without as good a job as one is capable of), negative changes later in life are of less moment. We may even believe he or she is entitled to demand the THR because he or she is optimistic that technological progress in medicine will reduce the risks of revision surgery by the time he or she needs it. It would nonetheless be

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[137] The rosy view (and definition) of shared decision-making is expressed well in M.J. Barry & S. Edgman-Levitan, *Shared Decision-Making—The Pinnacle of Patient-Centered Care*, 366 NEW ENG. J. MED. 780, 781 (2012). According to the latest Cochrane review of 86 trials published through 2009, the use of patient decision aids for a range of preference-sensitive decisions led to increased knowledge, more accurate risk perceptions, a greater number of decisions consistent with patients' values, a reduced level of internal decisional conflict for patients, and fewer patients remaining passive or undecided. The use of decision aids is also associated with patients' choosing prostate-specific antigen tests for prostate cancer screening and major elective surgery less often, which suggests that shared decision making could be a tool to help address the problems of overdiagnosis and overtreatment.

There are certainly scholars who are favorable to the shared decision-making ideal who are skeptical that its use is prevalent, though. *See, e.g.*, L.E. Jones et al., *Shared Decision-Making in Back Pain Consultations: An Illusion or Reality?*, 23 EUR. SPINE J. S13 (2014).

[138] Barry & Edgman-Levitan, *supra* note 138, at 780.

[139] *Id.*

perplexing to say that the patient should get the THR because his or her surgeon has those beliefs.

Yet our surveys, some of whose findings were reported in Part II(C) demonstrate that surgeon traits (most particularly age) and a mix of controverted factual and inevitably idiosyncratic normative beliefs have a huge influence on the recommendations that surgeons give. As I noted above more briefly, the age effects were quite strong: surgeons aged fifty to sixty-four years had significantly higher odds of recommending arthrodesis than did their colleagues under forty years of age in Vignette 1 (Odds Ratio (OR), 2.29; 95% CI, 0.84 to 6.24), Vignette 2 (OR, 4.55; 95% CI, 1.72 to 12.03), and Vignette 4 (OR, 2.40; 95% CI, 1.31 to 4.42).[140] Among surgeons sixty-five years and older, the odds of recommending arthrodesis were higher still for all vignettes, especially Vignette 2, where the patient has a very high BMI (OR, 9.35; 95% CI, 3.11 to 28.08),[141] and Vignette 4, where the patient is expected to do manual labor as an adult (OR, 6.04; 95% CI, 2.70 to 13).[142]

There could be two standard explanations for these strong age-effects, though the data we collected does not give much support for either. It is plausible that the younger surgeons were trained after THRs had become so commonplace that they would be uncomfortable performing (or recommending) arthrodesis, while the older surgeons would be less daunted by the operation—one could call this a "training effect."[143] But the older surgeons might additionally or instead be affected by age-related myopia. Just as adolescent patients undervalue their middle-aged selves, so might middle-aged and older doctors undervalue the needs or feelings of younger people so that when these surgeons compare the losses with which they can most clearly identify (immobility as an older adult) with ones that seem more temporally distant (e.g., a stigmatizing limp as a younger person), they overrate the importance of the deficit that seems more proximate to them. One could call this a "preference effect."

Neither explanation was clearly supported (nor refuted) by our surveys. With respect to training effects, previously unreported responses to our survey question which asked respondents to estimate the number of arthrodeses and THRs they had performed (both overall and on patients under twenty-five years of age) in the past two years

[140] Kelman et al., *supra* note 80, at 72.
[141] *Id.*
[142] *Id.*
[143] In a previous study, a co-author and I found extremely strong surgeon-age effects despite the plain absence of training effects. F.R. Dietz & M.G. Kelman, *Surgeon Age as the Major Factor in Recommendation of Uni-Compartmental Knee Replacement Versus High Tibial Osteotomy: A Case Study in Orthopaedic Decision Making*, 32 IOWA ORTHOP. J. 22 (2012). The younger surgeons in the study were trained by the older surgeons in the study and each group had performed each possible operation on many occasions. *Id.* at 25. In that study, we asked surgeons to recommend either a total knee replacement or a high-tibial osteotomy to a fifty-nine-year-old patient suffering from severe medial compartmental knee arthritis. *Id.* at 23. The high-tibial osteotomy would plainly be appropriate for a forty-year-old patient (because of the likely need for revision of a knee replacement in a younger patient and the difficulty of such revisions) and the knee replacement appropriate for a seventy-year-old. However, the proper decision for the fifty-nine-year-old is hard to determine. What we found is that 84% of young doctors (residents and fellows) recommended the operation that would be given to an old patient (the knee replacement), clearly viewing the patient's age relative to their own and seeing the fifty-nine-year-old as old, while 75% of the older doctors recommended the high-tibial osteotomy, thus treating the patient as young. ($P = .0048$). *Id.* at 25–26.

showed no statistical difference in the number of arthrodeses performed by surgeons under and over forty years of age, though the data on this issue was muddy and untrustworthy because many respondents appeared to misunderstand the question. Surprisingly, younger surgeons were far less likely than older surgeons to agree with the statement that "[a]rthrodesis is a more difficult operation to perform successfully than a THR."[144] While neither of these results rules out the training or competence explanation for the age effect we observed, both tend to point away from it.

With respect to egocentric age-related myopia, we did find that higher proportions of younger surgeons than older surgeons agreed with statements indicating that gains during young adult life should be weighed more heavily than losses in later life.[145] This is consistent with the view that young doctors possibly overweigh functionality in younger life and underweigh functionality in later life. However, the differences did not attain statistical significance at the $P < 0.05$ level, although the sample size for this comparison was small and underpowered, and the lack of statistical significance may well have been due to a lack of statistical power to detect any true differences.

What is clearer still is that a broad range of distinctions in beliefs and attitudes among surgeons dramatically influence their recommendations. Previously unreported multivariate regression analysis reveals that doctors who are technologically optimistic are roughly one-third as likely to recommend arthrodesis in the base case as those who are less technologically optimistic than average. Moreover, surgeons who agreed that there were real trade-offs between short- and long-term outcomes were much more likely to recommend arthrodesis than surgeons who did not agree with this proposition. Specifically, those who saw trade-offs had seventeen times higher odds of recommending arthrodesis in Vignette 1, nearly nine times higher odds in Vignette 2, thirteen times higher odds in Vignette 3, and more than four times higher odds in Vignette 4.[146] Most interestingly, surgeons who agreed that function in young adulthood was the priority had less than one-tenth the odds of recommending arthrodesis in Vignettes 1 and 3, and approximately half the odds of recommending arthrodesis in Vignettes 2 and 4.[147]

Responses to many of the other factual and attitude questions we asked that were not reported in the original published piece were highly associated with recommendations, in entirely expected directions. For instance, those who agree that a limp is stigmatized are 39.5% as likely to recommend arthrodesis as those who do not ($p < .01$). Those who agree with the statement that THRs are preferable because their benefits are certain to be enjoyed while the losses may not occur are 1.8% as likely to recommend arthrodesis ($p < .01$). Those who believe that young patients are unduly

[144] It is possible, of course, as some older surgeons have suggested, that arthrodesis really *is* a substantially more difficult operation to perform and the failure of younger surgeons to recognize that simply demonstrates their unfamiliarity with the procedure.

[145] 54.1% of respondents under forty years of age thought functionality in young life mattered more than functionality later because one established one's place in the world while young, compared to 40.1% of doctors forty years of age and older. Fifty-eight percent thought trade-offs between functioning in early and later life should be resolved in favor of the younger self, compared to 46.7% of the older doctors.

[146] Kelman et. al., *supra* note 80 at 72–73.

[147] *Id.* at 73.

likely to ignore distant events so that it is appropriate to prod patients to consider arthrodesis are 8.9 times more likely to recommend arthrodesis ($p < .01$).[148]

In sum, it seems quite imprudent to give surgeons substantial decision-making authority in these cases when their own personal world views bear so heavily on their recommendations. They do not appear to be making recommendations based on perceptions of the heterogeneous tastes of their patients but based on their own private preferences.

2. Problems with Parents or Guardians as Decision-Makers

At first blush, parents or guardians might seem to be the ideal decision-makers here because, as compared to the patients themselves, they are older and less prone to underweight the utility of the middle-aged self. Furthermore, because parents and guardians are more altruistically linked to the patient than the surgeon, they are less likely to confuse the outcome they most dread, given the salience of their own stage of life, with the outcome that is most dreadful from the patient's vantage point. Moreover, since they know the patient well, they are more likely to know how deep and abiding some of the teenage patient's relevant idiosyncratic tastes might be. A parent might well have better intuitive knowledge about his or her own child's response to pain than a surgeon would or whether that child would respond well to being seen as disabled or whether the child is relatively quick to adapt to differing forms of changed circumstances.

There are some reasons to be hesitant, though, about giving parents' plenary authority. First, even if they do not confuse their own perspective with the perspective of the patient (in a carelessly egocentric fashion) they may have a strong self-interest in their child choosing the THR that the doctor does not. If the child chooses the THR, the parent may be unlikely to *witness* any bad outcomes and yet is nearly sure, during his or her own lifetime, to see only the positive changes. Most of the bad outcomes from a THR that occur will occur when the child is in his or her 50s or older and the parents are elderly or deceased.[149]

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[148] We also found some interesting relationships between responses to fact and attitude questions and changing recommendations from the base case to the variants. Those respondents who believe that the consequences of limping are worse for women than for men are not significantly more likely to recommend THRs for female patients when they recommend arthrodesis in the base case. However, those who believe women more frequently complain of sexual difficulties are 5.25 times as likely to change their recommendations ($p < .01$), and those who believe women frequently complain about difficulties with urination are 3.99 times as likely to change their recommendation ($p < .05$). Once more, a distinction in the factual beliefs of the surgeon, not the patient, about the consequences of the operations may drive a female patient's surgical procedure to the degree the surgeon is empowered, formally or informally, to make the decision.

[149] If surgeon recommendations are self-interested, rather than carelessly egocentric in making judgments that are intended to be other-regarding, their *material* incentives are not at all clear. Medicaid reimbursement rates are almost identical for the two surgeries. In Iowa, for instance, where one of the co-authors of our survey practiced, the Medicaid physician payment for a hip arthrodesis with subtroch osteotomy (the procedure the co-author would do) (CPT 27286, RVU 25.17) was $1,120.48 in 2013, while the physician payment for a total hip replacement (CPT 27130, RVU 21.79) was not radically higher, at $1,380.66. It is, though, difficult to judge whether, all in, one operation is more profitable on a per-hour basis than the other. (Or even, if the surgeon is other-regarding and sensitive to the use of medical resources, actually more resource-intensive than the other). It is not possible to determine the malpractice

Second, and more significantly, there are reasons to believe that asking parents to make this decision would cause quite high levels of stress, requiring them to take on the burden of being the cause of something bad happening to their child. I understand claims that parents often want to take on a substantial role in care decisions and understand that doctors may underestimate their patients' desires for both information and decision-making authority.[150] Still, I think the evidence about parental preferences is especially ambiguous when one looks at decisions much like this one. In situations in which one decision could appear seriously wrong, looked at in hindsight, or in which parents can readily imagine that the adult version of the child would make a different decision than the parents are drawn to making, preferences for an active role fall and the stress associated with decisions one is duty-bound to make is quite high.[151]

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risk associated with each operation: if the patient needs a revision, the doctor may be sued, but patients are more likely to complain about an arthrodesis and investigate whether it was done properly when they suffer even the routine symptoms associated with the operation. It is also not clear if surgeons, like parents, want the patient to do well while they are still reasonably likely to be seeing the patient (following up); if so, that pushes towards the THR for them as well.

[150] There is an incredibly rich, if not especially consistent, literature both assessing the degree to which patients state a preference to receive more information and/or to exert more decisional authority. (Not surprisingly perhaps, there are many who seek information but not decisional authority; not surprisingly too, not every patient who expresses an abstract preference for more information or authority takes actions consistent with the expressed preference). There is also a substantial literature attempting to assess not only the degree to which doctors overestimate, underestimate, or properly estimate the proportions of patients seeking more information, but also whether their views of the desires of particular patients in their heterogeneous patient pool are concordant with the particular patient's actual wants. Absent a good domain-specific study of parent preferences for different forms of involvement in this particular decision, I think it is hard to say what the parents prefer or whether doctors even know what they prefer. A good sample of these articles include E.B. Elkins et. al., *Desire for Information and Involvement in Treatment Decisions: Elderly Cancer Patients' Preferences and Their Physicians' Perceptions*, 25 J. CLIN. ONCOL. 5275, 5277–78 (2007) (showing that physicians' views are concordant with each patient's actual views in slightly more than 40% of cases in terms of desires for information and in terms of desires for control); B.J. Keulers et al., *Surgeons Underestimate Their Patients' Desire for Preoperative Information*, 32 WORLD J. SURG 964 (2008) (expressing what appears to be the most common view, that physicians are most prone to underestimate demand for information); W.M. Strull et. al., *Do Patients Want to Participate in Medical Decision Making?*, 252 JAMA 2990, 2991 (1984) (finding that physicians *over*estimate the proportion of patients who want decision-making control, believing 78% do compared to the 53% who actually do). One way of thinking about the need for highly domain-specific studies of patient desires is to reflect on findings (hardly immediately intuitive) that patients exhibit far less desire for control when they have hematological cancers than solid mass cancers. *See* J. Ernst et. al., *The Desire for Shared Decision Making Among Patients with Solid and Hematological Cancer*, 20 PSYCHO-ONCOL. 186 (2011).

[151] Take, for instance, parental preferences for involvement in decisions about anesthesia. Parents overwhelmingly prefer an active role (52%) or at least shared decision-making (40%) when it comes to the decision whether to be present in the operating room when the child awakens from anesthesia, where bad outcomes from their decision, *ex post*, are not plausible. But a solid majority of parents would prefer to be passive (56%) and only 7% want to be active when it comes to decisions that could prove to be quite mistaken in retrospect about intra-operative pain management. *See* A.K. Tait et. al., *Patient Preferences for Participation in Decisions Regarding Their Child's Anaesthetic Care*, 11 PEDIATR. ANESTH. 283, 285–87 (2001). And parents reported considerable stress in making decisions to give infants cochlear implants, knowing that the child might grow up to be somebody who would have preferred to communicate using American Sign Language or other forms of sign language or who might have preferred the use of hearing aids to gain moderate bilingual ability. *See, e.g.*, S. de Souza Viera et. al., *Cochlear Implant: The*

But the problem is even more serious. The patients for whom parents might make decisions here are not young children, scarcely able to express their own desires. If parents are granted plenary decision-making authority on this issue, they will have to exercise it after having heard what their *adolescent* child prefers. They would be abdicating the responsibility entrusted to them to exercise non-myopic judgment if they simply followed the child's wishes. If, though, the parents contradict the child's wishes, there may be long-term conflict, stress, and even ruptures in the familial relationship that might not have occurred if the parent had been not been given this sort of exclusive authority (either because there was some shared decision-making procedure or because the doctor, an "outsider," exercised greater levels of authority).

There are, then, serious problems with allowing the patient, doctor, or parents to have full discretion to make this decision without further guidance. Thus, I now turn to consider whether we can improve the decision-making process.

IV. POSSIBLE SOLUTIONS

To understand whether we can improve decision-making in this area, it is important first to understand, conceptually, why we might look to identify observable proxy traits that each patient possesses that could help us predict what his or her stable, non-myopic preferences would be. I turn to that conceptual issue in Part IV(A) before describing, in Part IV(B) why it might be particularly difficult to utilize proxies in this case. Part IV(C) considers what proxies could be used in this area and addresses an additional problem: what might we do to alter decisions or the decision-making process if we could identify observable traits that served as proxies for ideal decisions? Finally, Part IV(D) provides potential policy responses to patient traits when making this decision.

A. The Conceptual Problem: What Are We Looking to Find

Imagine, first that there were a group of people affected by a decision, each of whom made the exact same decision as one another and that each decision-maker reached the conclusion that he or she did because his or her decision-making process was defective along some significant dimension. For example, from the vantage point of some observers, decisions driven by myopia may be thought to be procedurally defective, ignoring or underweighting the subject's underlying interest in maximizing his or her well-being over his or her entire life span. Similarly, decisions by addicts to use drugs may be seen as imprudent and defective.[152]

Complexity Involved in the Decision-Making Process by the Family, 22 REV. LAT. AM. ENFERMAGEM 415, 419–20 (2014).

[152] This does *not* mean that the decision-maker did not exercise any other capacities; it simply means, at strongest, that, given the defect, there is only one possible decision he or she can realistically arrive at or, more weakly, that the defect substantially altered the probability of reaching one decision rather than the other. In this view, the adolescent who chooses the THR is not monomaniacal: she may be thinking about a lot of things (pain, stigmatic limping, relative ease of rehabilitation, even the information her doctor is giving her about revision rates in the past and why they may be dropping because of improvements in the materials used in modern arthroplasty); but given her myopia, it is (in the stronger view) inconceivable, or nearly so, that she would decide to get the arthrodesis or (in the weaker view) substantially less likely that

Second, imagine that while we know there is no single ideal decision—the group is heterogeneous in terms of the probabilistic distribution of objective outcomes that would be expected to result from alternative decisions and also heterogeneous in tastes and goals—there is a decision for each person that we believe to be ideal in some sense. So, for example, one might believe that all addicts choose to use drugs for a bad reason (they are short-sighted and care only about an immediate powerful craving) but that it could still be an ideal decision for a particular addict to use drugs on a particular occasion, under some conception of what an ideal decision is. It could be ideal in the sense that it is consonant with his or her second order preferences (i.e. preferences about the preferences one develops).[153] It could be ideal in the sense that the subject would reaffirm his or her initial decision upon reflection.[154]

Third, and finally, imagine that while the affected party does not have ready access to his or her ideal preference or choice, there are externally observable markers that, at their strongest, tell us what the ideal choice *for that individual* is or, more plausibly in some cases, make it seem credible that the choice that defective decision-makers would typically make happens to be the ideal choice for that party. This may be true because his or her circumstances are atypical in ways that make the concrete consequences of his or her decision ideal. It is plainly sensible, for instance, to permit, extol, or perhaps even mandate the ordinarily suspect myopic choice if outsiders can observe that the decision-maker will die before the negative consequences of short-sightedness will be manifest. More controversially, and perhaps more interestingly, it may be true because we can observe traits that correlate with the decision-maker's idealized tastes for outcomes he or she will experience.[155]

Here is the key conceptual point: what we are looking for to guide the THR/arthrodesis decision are objective markers of both sorts that would help us determine either a single ideal decision for each patient or, more weakly, factors that need to be attended to more carefully given the particular nature of the patient, in either nudging him or her towards a particular decision or informing and talking to him or her about these personally relevant features rather than merely giving the patient generic information about his or her medical condition and treatment options. The first question, then, is straightforward: do patients whose ideal prudent selves would choose THRs have

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she would make the non-myopic choice. Similarly, an addict might be drawn to drugs because he realistically assesses the distinction in his proximate mood both with and without them and even considers (and gives some psychic weight to) the untoward effects the drug use will have on his relationship with loved ones; but (strong form) he will always choose the drugs or (weak form) he is far more likely to choose the drugs than his non-addicted self would be.

[153] The classic discussion of second-order preferences is found in H. Frankfurt, *Freedom of the Will and the Concept of a Person*, 68 J. PHIL. 5 (1971). I discussed such second-order meta-preferences in Mark Kelman, *Choice and Utility*, 1979 WISC. L. REV. 769 (1979).

[154] For a discussion on distinguishing choices that might be reaffirmed from those that are regretted, see Kelman, *supra* note 153, at 784–87.

[155] So, to take a wholly fanciful example to help clarify the point, imagine that those who *should* use drugs have a particular genetic marker that we can see or test for or, to take a somewhat less fanciful example, imagine that we believe that a particular addict choosing drugs would observably suffer horrific psychic or physical pain if he or she did not continue to use. In that case, we might believe the decision to use is, or could be, ideal for him or her, even though we believe he or she would make this decision solely as a result of his or her addiction.

a discernible or distinct trait? Those whose ideally prudent selves would choose arthrodesis? What do we do if there are a *set* of traits that characterize those who "should" get THRs—some of which the patients have and some of which they lack, and many of which are not dichotomous traits but are possessed on a "more-or-less" sort of continuum—and we must construct something akin to an "index" of observable traits to determine what we think the idealized chooser would select?

B. The Difficulty of Applying This Procedure to the THR/Arthrodesis Decision

I believe that we employ a decision-making algorithm that resembles the one I hope to use in guiding the THR/arthrodesis choice in a number of cases. I want to make particular reference to a single contrasting illustrative case, largely to highlight why it will be radically more difficult to implement this broad kind of decision-making procedure in the THR/arthrodesis decision case than in mildly "cognate" situations.

Assume that the policy against permitting suicide—and its more administrable correlate, a policy forbidding assisting another's suicide[156]—is grounded to a significant extent in the idea (whether adequately backed by data or not) that those who would choose to commit suicide are defective decision-makers.[157] They may be defective decision-makers in the sense that they are unduly trapped in the moment, myopic not because of exaggerated discount rates but because they are so fixed on what wrongly seems like unending problems or a horrific depression that feels as though it will be endless that they are unable to imagine a future self who would want to have lived through what would (or might) prove to be a more temporary storm. They may also be defective decision-makers in the sense that they are both vulnerable to, and extremely subject to, the undue influence of others who consciously or unconsciously find them a burden.

However one sorts through the massive literature on the causes of suicide,[158] the key point within this framework is that the willingness to proscribe suicide is most credibly grounded in the belief that virtually anyone who would choose suicide is a defective chooser. The default policy and legal position can therefore be that suicide is

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[156] Most states impose extremely severe penalties for those who do not merely aid suicide but cause it through force, duress, or deception, and serious penalties for those who either solicit or physically aid another who commits suicide. The Model Penal Code's provisions in this regard are quite representative. *See* MODEL PENAL CODE § 210.5. (AM. LAW. INST. 1985). For a good summary of variations in state law on suicide assistance, see Katherine Ann Wingfield & Carl S. Hacker, *Physician-Assisted Suicide: An Assessment and Comparison of Statutory Approaches Among the States*, 32 SETON HALL LEGIS. J. 13 (2007). Bans on assisted suicide were held to be constitutionally permissible, against claims that they unduly interfered with the patient's autonomous control over his or her own body and life and that they drew irrational distinctions between those who could die simply by refusing care and those who needed to take more active measures to terminate their lives. *See* Vacco v. Quill, 521 U.S. 793 (1997); Washington v. Glucksberg, 521 U.S. 702 (1997).

[157] Obviously, the opposition to suicide or assisted suicide may come from other sources, most notably principles that each life is sacred and that the individual is no more entitled to destroy his or her own sacred life than he or she would be entitled to destroy another's life.

[158] For comprehensive literature surveys and interpretive commentary, see, e.g., KRISTINE BERTINI, UNDERSTANDING AND PREVENTING SUICIDE: THE DEVELOPMENT OF SELF-DESTRUCTIVE PATTERNS AND WAYS TO ALTER THEM (2009); RONALD W. MARIS ET. AL., COMPREHENSIVE TEXTBOOK OF SUICIDOLOGY (2000).

prohibited. Those who favor permitting, but regulating, suicide and assisted suicide look to increase the odds that whatever suicides we observe will be suicides that a more "ideal" decision-maker might choose. One way to increase the odds that the decision is not myopic—an approach more consonant with "informational" approaches that still leave a high degree of discretionary decision-making authority in the hands of the patient—is simply to make sure that the patient is as informed as possible about his or her condition, health prognosis, and alternatives (e.g., palliative care in hospice).[159]

But this is plainly not all we have done: those who would assist patients in committing suicide are permitted to do so only if we observe that those seeking to end their lives have objectively observable traits that make us believe that it need not be myopia, but rather a more universally acceptable judgment that no improvement in his or her life circumstances is plausible, that drives the decision. There are three necessary, objectively observable circumstances that shake our ordinary presumption that a suicidal decision-maker has not adequately accounted for a hypothetical future self's desires. First, the decision-maker must be terminally ill, so that his or her future is short. Under Oregon law, for instance, the patient must be suffering from a terminal disease ("an incurable and irreversible disease that … will, within reasonable medical certainty, produce death within six months")[160] rather than the ill effects of age or disability.[161] Second, his or her physical condition must be steady or irreversibly deteriorating in a way that makes us confident that there will be no future self whose quality of life is better than the present-fixated decision-maker's quality of life.[162] And finally, we must believe that parties around the patient who might have some self-interest in his or her death have not put pressure on the patient to end his or her life, i.e. believe that the decision-making procedure is not defective in the sense that the decision is responsive to undue influence or coercion.[163] Of course, policy makers might believe there are more or different

[159] *See, e.g.*, OR. REV. STAT. § 127.815(1)(c) (2014) (mandating that those who seek assistance in ending their lives receive such information).

[160] OR. REV. STAT. §§ 127.800(12) (2018), 127.805(1) (1999).

[161] § 127.805(2). For one of many examples of attacks on physician-assisted suicide statutes by disability-rights advocates who fear both that disabled persons will be subject to undue pressure from others to commit assisted suicide and that permitting suicide for the disabled but not the general population expresses disrespect for, and misunderstanding of, the lives of people with disabilities, see, T.H. Lillie & J.L. Werth, Jr., *End-of-Life Issues and Persons with Disabilities*, 16 J. DISABILITY POL'Y STUD. 2 (2005).

[162] Presumably, those who strongly believe in the possibility of substantial hedonic adaptation would add in the qualification that the decision-maker have adequate experience with his or her physical condition to make whatever adaptations he or she is going to make.

[163] Given this fear of undue influence, we may believe that too many decisions to commit suicide are initiated by parties other than the patient him- or herself. If we are worried about such influence, we may permit physician-assisted suicide only when the patient is the first to initiate discussions with the doctor of his or her desire to terminate his or her life, *see, e.g.*, § 127.805, and when the patient reaffirms that decision both orally and in writing, *see* OR. REV. STAT. § 127.840 (1995). Finally, we may direct the physician to refuse to aid the patient in taking his or her own life unless the physician is certain that the decision was not the product of undue influence. Oregon Revised Statute § 127.815(1)(d)–(e) (2014) directs the physician who will assist the suicide to refer the patient to a consulting physician who will determine, among other things, whether the request for assistance is voluntary.

circumstances in which we might believe a decision to commit suicide met longer-term ends.[164]

Naturally, we still never *compel* suicide. There are no objectively observable circumstances that make us think suicide is inexorably the right choice, but there *are* circumstances in which we believe that if it is something the decision-maker desires, it could be an ideal choice for the patient.[165]

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[164] One of the obvious questions that arises is whether those suffering from dementia, or on the verge of suffering more severe dementia, should be permitted to seek aid in ending their lives. Obviously, there will be special problems if we decide that those suffering from irreversible dementia are suicide-eligible not only because we may think that dementia, like other disabilities, is more dreaded than objectively dreadful in the apt ways, but because those with dementia cannot give competent present consent to assistance, and prior directives given before the patient becomes demented may be thought of as inadequately informed. For a critique of proposals to permit the demented to be eligible for physician-assisted suicide, see John B. Mitchell, *Physician-Assisted Suicide and Dementia: The Impossibility of a Workable Regulatory Regime*, 88 OR. L. REV. 1085 (2009).

One could also imagine looking to observe only broader (and more vaguely defined) circumstances that would overcome our ordinary presumption that suicide is the product of defective choice processes. In the Netherlands, for instance, the "objective condition" we seek to observe is that the patient must be undergoing "unbearable suffering." For a description of Dutch law, see Andre Janssen, *The New Regulation of Voluntary Euthanasia and Medically Assisted Suicide in the Netherlands*, 16 INT'L. J.L. POL'Y & FAM. 260 (2002).

[165] Not surprisingly, the "objective indicia" we use to identify those whose decision to commit suicide is less sure to be a product of deficient decision-making ability suffer from some of the same problems that bedevil the efforts I will make in Part IV(C), *infra*, to identify objective traits that are proxies for the underlying "prudent" belief that one of the two hip operations is the more reasonable choice for the individual. It is not easy to ascertain whether the proxy is present or not (just as we will see that it is difficult to determine readily if someone was pain-tolerant or not). It is not simply the case that "unbearable suffering" is difficult to identify (it is vaguely defined on its face) but, as a matter of fact, doctors also do not even really know for sure when someone will die within six months. Over half of doctors surveyed in Oregon stated that they cannot generally predict whether a patient will die within six months. *See* JOHN KEOWN, EUTHANASIA, ETHICS AND PUBLIC POLICY: AN ARGUMENT AGAINST LEGISLATION 172 (2002).

Even if we could observe the presence or absence of a proxy trait, it is not clear that the proxies we are using are good ones. For instance, being terminally ill is not necessarily a good proxy for being in a position where the decision to take one's life is less impulsive. Nor is it transparently true that terminally ill people generally (absent high levels of suffering for which terminal status is a very imperfect proxy) do not choose to commit suicide largely on the mistaken myopic belief that the end of life will not be worth living through.

The opposition to assisted suicide does not come merely from paternalistic motives of course: many opponents of strongly easing access to suicide fear that permitting assisted suicide is inconsistent with showing adequate respect for the value and sanctity of life. For some with such views, assisted suicide is permissible not when it is a considered and prudent decision but only when motivated by a desire to avoid certain sorts of intense physical suffering. For such persons, of course, the fact that a terminally ill patient worries about financially burdening his family or has become depressed by the prospect of death is of no normative moment, even if those beliefs are not myopic and would persist, unaltered, until death. At the end of the twentieth century, when there were widespread debates in state legislatures over permitting physician-assisted suicide, public opinion polls suggested that the majority of Americans believed that physician-assisted suicide was appropriate only for terminal patients suffering from unremitting pain, not for those who had merely lost their desire to live or feared becoming a burden to loved ones; they feared sliding down a slippery slope towards loss of respect for the sanctity of life if assisted suicide was allowed in instances other than the narrowest situations. Christine Neylon O'Brien & Gerald A. Madek, *Physician-Assisted Suicide: New Protocol for a Rightful Death*, 77 NEB. L. REV. 229, 274 (1998).

What makes the THR/arthrodesis decision here even harder than the assisted suicide case, assuming that the adolescent decision-maker's choice of the immediate THR is defectively myopic, just as the decision to commit suicide is in some similar ways a product of the suicidal subject's inability to imagine a relevant future self who would regret the decision? The obvious distinction between the two is that even if the decision to get the THR is almost always at least heavily influenced or at worst determined by myopia, it is by no means always *wrong* from the vantage point of a more idealized chooser. It might be the decision that adolescents make too easily because they are indifferent to their middle-aged selves, but it could also be the decision many or most would make, perhaps with more difficulty, attending to that self in an ideal fashion. What this means, in practical terms, is that we cannot simply look for a set of "special circumstances" that make the THR acceptable (e.g., the patient will not outlive the THR revision[166] or the patient has already experienced a substantial period in which his or her mobility has been severely compromised and has not reacted adversely to that) because it is not only acceptable under a quite wide range of circumstances but may even be the "ideal" decision in the majority of cases. Still, the fact that we search for observable proxies that allow us to distinguish the defective, myopic choice from a choice that is at least potentially less defective when considering the permissibility of assisting suicide is quite instructive.[167]

It appears plausible to me that the terminally ill are permitted to receive aid in committing suicide not merely because their decision to do so is thought of as more rationally comprehensible and stable, but because the consequences of the decision being irrational are thought to be less severe: they will die soon in any case. Pressed too hard, that is probably not a sustainable argument. We don't, after all, think murderers are partly excused when they kill the terminally ill (at least unless motivated by a desire to relieve suffering), merely by virtue of the fact that they have ended a life that was soon destined to end.

[166] Of course, the reason a THR is the obvious surgical choice for most late-middle-aged and older adults with a range of severe hip problems is precisely because they are unlikely to outlive the implanted hip.

[167] There is another far less emotionally fraught policy domain—pension policy—in which we also seek to identify circumstances in which we believe that a choice we would ordinarily try to dissuade because it is imprudent might well be prudent. In much the same way that we believe the decision to end one's life (and the decision to select the THR) are affected by myopia, we may believe that myopic younger adults under-save for the future, failing to act on what we take to be the choice an idealized chooser would make. The idealized choice would be (more or less) to smooth consumption over the course of a lifetime. Consumption-smoothing is ideal on the assumption that the marginal utility of income declines, so that spending 1.5*X* in Period 1 and .5*X* in Period 2 will generate less utility than spending *X* in each of the two periods. If we believe this, we may both provide incentives to save for the future in the first instance and, more important for understanding more generally the use of observable proxies for non-myopic tastes, penalties for withdrawing money that has been set aside, believing that such withdrawals are motivated by myopic under-weighing of the future self.

So generally, we try to increase initial savings by giving tax benefits to those who set aside funds. For brief descriptions of tax incentives for pension savings through both 401(k) accounts and Individual Retirement Accounts (IRAs), focusing on their efficacy in increasing savings rates, compare E.M. Engen et al., *The Illusory Effects of Savings Incentives on Saving*, 10 J. ECON. PERSP. 113 (1996) (expressing skepticisim that the incentives have increased aggregate private saving, rather than the form that savings take, consistent with their more general view that tax incentives most clearly impact the timing of economic transactions, rather than the form in which transactions are organized and, last and considerably least, the agent's real decisions, such as the level of savings), with R.G. Hubbard & J.S. Skinner, *Assessing the Effectiveness of Savings Incentives*, 10 J. ECON. PERSP. 73 (1996) (finding robust incentive effects, consistent with their more general view that real decisions—work–leisure trade-offs, inter-temporal allocation of consumption—are sensitive to shifts in the relative prices associated with each decision). We

C. Proxies and the Use of Proxies

Our hope, then, is to be able to discern in a patient a substantial set of observable traits that are associated with reactions to physically plausible outcomes that an idealized decision-maker would account for. In Part IV(C), I attempt to identify some plausible proxies for idealized choices,[168] noting difficulties I would expect to encounter if we tried to use the identified proxies.[169] At that point, how we would act would depend on our preferred policy response. While I return to discuss the *use* of proxies in more detail in Part IV(D), suffice it to say that we would, if moving in the more paternalistic directions that I will detail (either nudges/defaults or hard paternalism), have to construct something like an index that gave us a score to tell us whether the person had a mix of discernible traits that predicts that an idealized chooser would make the non-myopic decision. I discuss problems of index construction as well.[170] If instead, we were moving in the

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might also make setting aside money for retirement the default option in the assumption that defaults are sticky. The utility of such defaults in increasing pension savings is summarized well in John Beshears et al., *The Importance of Default Options for Retirement Saving Outcomes: Evidence from the United States*, *in* LESSONS FROM PENSION REFORM IN THE AMERICAS 59, 73–78 (Stephen J. Kay & Tapen Sinha eds., 2008). At the same time—and this will be key to our discussion—we typically penalize efforts to withdraw saved funds before retirement under I.R.C. § 72(t)(1) (2012).

What is most important from my vantage is that the 10% penalty for premature withdrawals of pension savings does *not* apply when the party seeking to withdraw funds meets particular objective criteria—criteria that would presumably indicate that there is at least a substantial possibility that the decision to withdraw savings is not a product of myopia or impulsiveness but meets the long-term prudent interest in maximizing lifetime utility. There are reasons in each case to believe that the marginal utility that could be gained from spending the income currently when these conditions obtain is indeed higher than the utility that would be gained if the withdrawn funds were spent later. Thus, for instance, no penalty will be assessed when funds are withdrawn to pay for medical care, § 72(t)(2)(B), when the employee is disabled, § 72(t)(2)(A)(iii), or dead, § 72(t)(2)(A)(i). A pension-holder may also withdraw money without penalty to buy a first home, § 72(t)(2)(F), or to pay for higher education, § 72(t)(2)(E).

In each case, we rely on at least one of three reasons to conclude that the withdrawn funds will generate more utility now than they would later. First, the expenditure might be thought to meet a more urgent "need" rather than a less intense "want" that might be satisfied later (most obviously, medical care expenditures). Second, when the condition obtains, it is plausible that deferring consumption will *not* result in utility-maximizing consumption-smoothing (most obviously, death, but perhaps to a certain degree disability). Third, it may be that certain withdrawals serve not so much to increase current consumption relative to future consumption but to act as investments that increase consumption in all periods (most obviously, higher education expenditures and, to a lesser extent, medical care expenditures and, to a still lesser degree perhaps, first-home purchases). Certainly, the purchase of an extremely durable good like a house does not accelerate consumption into the current period in a manner similar to the purchase of a good whose "services" are consumed over a much shorter period.

[168] I return at the end of Part IV(D), *infra*, to discuss the possibility that one might also use observable proxies not so much to identify an ideal choice but to identify whether or not the patient needs guidance at all and whether he or she was a sufficiently non-deficient decision-maker to be given discretion to make the choice without being given anything but technical outcome information. For instance, we may think we may be able to identify the sub-set of adolescents with atypically low susceptibility to the sorts of focusing effects that typically lead people to fear life changes or those with atypically low discount rates.

[169] Although I believe I can identify some of the factors an ideal decision-maker would weigh in making this surgical-choice decision, I am certain that I have not provided a complete list of factors that influence the appropriate trade-offs between the operations.

[170] I am not at all confident that a weighted index can be constructed that aptly summarizes a patient's profile: I am highly dubious that we have reasonable ways to scale each trait individually (assuming, as I

direction of trying to shift the shared decision-making process in a heavily value-clarifying direction, rather than one in which the doctor largely provides technical information and largely absorbs information from the patient about his or her values and tastes, we might simply emphasize patient traits from the list of predictive considerations that may be most relevant to his or her considering the decision he or she is less prone to make initially, and then, to emphasize those that might move his or her idealized self back in the direction of making the more intuitive THR decision.

What traits would make the arthrodesis more ideal? Are the traits observable, rather than subject to the inevitable strategic distortion that would beset the process if we relied on self-reports of the traits, or is self-report our only realistic choice?[171] I present the list cautiously, hoping as much to spur discussion of the issue among relevant policymakers as to resolve this issue:

1. Patient is Atypically Likely to Require Revision of the First THR

Here I am raising the issues that I noted earlier seem unresolved in the existing literature. To what degree, if any, does higher BMI increase the probability that the hip will require revision? To what degree is a patient with a particular job profile (less sedentary) more likely to need a revision?[172] To what degree can we predict the adult occupation of an adolescent patient? Are certain recreational activities more likely to increase the need for a revision and, if so, can we get an inventory of recreational desires for an adolescent that predicts future recreational wants? Must we adjust that to account for distinctions in the degree to which the particular patient, in the short and longer run, will comply with physician recommendations that he or she forego certain activities that are likely to wear out the artificial hip?[173] As far as I can discern from the orthopedics literature, there is nothing that can be observed about an adolescent patient that would

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do, that those who are less pain tolerant should "ideally" select the THR, all else equal, *how much worse* would an ideal decision-maker find it to be in the 5th percentile of people in terms of tolerating chronic pain than the 25th?). And I am even more dubious that we could construct a credible index that summed across the domains: if a patient is quite pain-tolerant (suggesting the arthrodesis) but is far worse than average at dealing with "looking different" so that a limp will be more dysphoric (suggesting the THR), does that "add up" to someone making a good call on receiving the THR or not compared to someone who is a little less pain-tolerant and a little more tolerant of limping?

[171] Here is the strategic distortion problem: assume that the myopic patient wants the THR, knows he or she is likely to be given the option of getting the THR only if he or she is highly pain-intolerant, and that the only source of information about his or her pain tolerance is self-report. In this case, the strategic patient will obviously then report that he or she is highly pain-intolerant.

[172] *See supra* notes 22 and 23.

[173] Patient-compliance rates with long-term medical regimens are not especially high. Most relevant to this case, there is evidence that patients will comply with directions to make lifestyle changes in only 20–30% of cases. Can we identify patients more likely to comply so that we might worry less about a patient with an underlying preference to engage in high-impact or contact sports that may compromise the longevity of the artificial hip? A thorough literature review by Jin et al. suggests both mixed findings and modest effects on compliance based on demographic factors and, while finding some (rather intuitive) individualized factors that increase compliance (e.g., belief that one is susceptible to a serious consequence absent compliance, a belief that the regimen is efficacious, low levels of depression), it is not clear to me that one could assess *ex ante* whether one is dealing with a patient with the relevant beliefs, even if one could screen for exogenous depression. *See* J. Jin et al., *Factors Affecting Therapeutic Compliance: A Review from the Patient's Perspective*, 4 THER. CLIN. RISK MANAGE. 269 (2008).

predict the likelihood that a revision operation, if needed, would be successful for the particular patient. But it is entirely possible that that conclusion is unfounded.

Naturally, it is not clear that every idealized decision-maker would choose the arthrodesis even if absolutely certain to be wheelchair-dependent to meet mobility needs if he or she survived until middle age so that it seems plausible that higher probability of need for revision should be seen as no more than a factor to be weighed in constructing an index. It is not clear at all how to weigh distinct shifts in probability short of certainty if constructing an index.

2. Patient Has an Atypically High Preference for Risk, Even in Short-Term Gambles

Obviously, we are trying to dissociate risk-proclivity as a defining personal trait from risk-proclivity in relationship to temporally distant risks produced by myopia. To the extent that the patient "is" a risk-taker, his or her idealized self is more prone to choose the immediate THR. There are certainly a variety of techniques that psychologists and economists have used to elicit risk-preferences, ranging from fairly simple methods (e.g., subjects may play a game in which one gets more money if one pumps more air into a cartoon balloon which might pop if too much air is blown in, causing the subject to lose all his accumulated money, or a simulation of choices between riskier and safer assets, or responding to questionnaires) to more complex multiple price list methods.[174]

They are all quite problematic, though, in helping us think about whether the particular adolescent patient is a "genuine" risk-avoider (who should be nudged, all else equal, towards the arthrodesis or at least guided to consider that he or she has a trait consistent with making that choice). The problem is that there is little reason to believe that people who show high risk-proclivity using any of the experimental elicitation methods demonstrate higher than typical risk-proclivity *across domains*. For example, Dohmen *et al.* found that a measure that allows for the estimation of an overall risk-proclivity coefficient had only modest predictive power for real world, risky behavior in such domains as employment, car driving, and health (and less predictive power than measures of domain-specific risk-proclivity),[175] just as risky (or myopic) behavior in one domain does little to predict it in another.[176] Risk aversion, at a general level, is associated with neuroticism scales in Five Factor personality tests,[177] but, for at least some sorts of gambles, is also associated with lower levels of intelligence, conventionally measured.[178] But it is by no means the case that the associations are so high that one would comfortably describe a person with high "neuroticism" or low IQ scores as "authentically risk averse."

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[174] For an excellent summary of widely used methods, see G. Charness et al., *Experimental Methods: Eliciting Risk Preferences*, 87 J. ECON. BEHAV. & ORGAN. 43 (2013).

[175] *See* T. Dohmen et al., *Individual Risk Attitudes: Measurement, Determinants and Behavioral Consequences*, 9 J. EUR. ECON. ASS'N 522, 538–41 (2011).

[176] *See* FUCHS *supra* note 128.

[177] For a discussion of the connection between neurotic anxiety and risk aversion making this point, see, J.B. Hirsh & M. Inzlicht, *The Devil You Know: Neuroticism Predicts Neural Response to Uncertainty*, 19 PSYCHOL. SCI. 962 (2008).

[178] *See* S.V. Burks et al., *Cognitive Skills Affect Economic Preferences, Social Strategic Behavior Awareness, and Job Attachment*, 106 PROC. NATL. ACAD. SCI. U.S.A. 7745, 7748–50 (2009).

3. Atypically Adverse Reactions to Wheelchair-Reliance

Once more, one would think that there would be distinctions in the degree to which wheelchair-reliance is experienced as dysphoric, independent even of distinct tastes for activities that require non-wheelchair assisted mobility. There might well be traits associated with finding the state more or less dysphoric in the first instance and distinctions in the extent to which we would expect a particular person to adapt hedonically to requiring the wheelchair to meet mobility needs. One could readily argue that a person with traits that are associated with atypically good reactions to wheelchair-reliance would be expected to make stable, non-myopic decisions to receive an immediate THR while, more interestingly, someone predicted to have atypically negative reactions should be moved towards the arthrodesis, all else equal, if we believe that we should move people towards manifesting their more idealized preferences.

There are a large number of studies in which authors attempt to demonstrate associations between hedonic reactions to wheelchair-reliance and both measurable personality traits, generally expected to be present over the course of the subject's life, and some social factors that might be difficult to predict decades into the future.[179] The work seems useful, in theory, but I strongly fear that it is close to useless in operational terms for my purposes. First, almost all of the relevant studies that I could locate predict reactions to spinal cord injuries, the most common cause of wheelchair-reliance. While both spinal cord injuries (SCIs) and unsuccessful hip surgery may cause wheelchair - reliance, they differ in significant ways as well. SCIs typically occur after a trauma, and people have distinct and meaningful reactions to the trauma itself. SCIs may also be associated with higher levels of pain and more typically may be associated with higher levels of privacy loss and the need to turn over some tasks that had been done through self-help to aides.

Second, and far more important, the literature is quite inconsistent in important ways, differing substantially not only in terms of estimating the overall level of suffering the authors perceive in SCI patients (for instance, literature reviews show estimates of the proportion of those who have had SCIs experiencing depression, compared to the general population, that range from mildly higher to twenty times as high),[180] but in terms of the inventory-based factors that heighten vulnerability to shorter and longer-term depression and anxiety.[181] Third, and perhaps most important of all, it is not at all clear that traits that

[179] The literature I found most relevant is cited *infra* in notes 180-181.

[180] For a good literature summary of post-SCI depression, see Table 2 in A. Craig et al., *Psychological Morbidity and Spinal Cord Injury: A Systematic Review*, 47 SPINAL CORD 108, 110 (2009).

[181] Here is just a sample of the literature I am relying on in describing reactions to spinal-cord injuries that necessitate wheelchair use. There are authors who focus on the fact that "agreeable" patients do much better adapting than others (but find that no other personality traits seem to matter much). *See, e.g.*, C.J. Boyce & A.M. Wood, *Personality Prior to Disability Determines Adaptation: Agreeable Individuals Recover Lost Life Satisfaction Faster and More Completely*, 22 PSYCHOL. SCI. 1397, 1399–1401 (2011). But even if they are right that being agreeable counts, it is unclear if the impact of agreeableness is indirect—agreeable people may get more social support and it might be the social support that matters—so that it might be better to try to predict more directly how much social support the middle-aged wheelchair-reliant patient is likely to have (e.g., because he comes from a large cohort of siblings, or is a member of a tight-knit religious community). Others emphasize that SCI patients with a particular coping style—those who "catastrophize" bad events—may do especially badly. *See* K.A. Raichle et al., *Cognitions, Coping,*

predict better or worse reactions to wheelchair-reliance would not also predict better or worse reactions to the ill effects of the arthrodesis—pain, inability to perform some routine activities, stigma, etc. Thus, if our goal were to identify people for whom the immediate THR is an especially bad choice, merely knowing that a patient would react relatively badly to one of the bad outcomes of the THR is of little help if what we may be learning, at the very same time, is that he or she would do atypically badly if he or she accepts the alternative treatment as well.[182]

At core we should be looking for *differentiating* traits; thus, for instance, it would be helpful to identify patients who are at once relatively pain-insensitive *but* prone to react poorly to immobility. Or, to take a hypothesis for which I could find no existing evidence, imagine that people who were atypically claustrophobic—vulnerability to claustrophobia seems to have a genetic marker, so it might be measured even without relying on self-reporting[183]—were made atypically anxious and depressed by the sorts of immobility associated with wheelchair-reliance, though it had no impact on their pain tolerance, their discomfort with finding it difficult to perform some tasks, or their young-adult vulnerability to stigma. Claustrophobia would then be a trait that would push an idealized decision-maker towards arthrodesis.

4. Pain Tolerance

All else equal, a more pain-tolerant person ought to pick the arthrodesis over the immediate THR since one of the chief costs of the arthrodesis is a non-trivial period of substantial pain. We could in theory measure different forms of pain sensitivity of each patient considering the operation. To the degree that the measurements were reliable in measuring reactions to the kind of pain associated with arthrodesis and to the degree that these measures of reaction to acutely painful stressors correlated well with reactions to long-term, more chronic pain, they would be useful. Alternatively, if there were good "genetic markers" for pain sensitivity, we could observe those instead of observing the behavioral manifestation.[184] Again, there is a rich technical literature on each of these

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and Social Environment Predict Adjustment to Pain in Spinal Cord Injuries, 8 J. PAIN 718 (2007). Still others, utilizing the standard Five-Factor Personality Model inventory, with its various sub-traits, claim that neuroticism and extroversion predict bad outcomes for those with SCIs, as does fantasizing, but that high scores on "Action, Ideas and Values" predict good hedonic outcomes. *See* J.S. Krause & Daniel E. Rohe, *Personality and Life Adjustment After Spinal Cord Injury: An Exploratory Study*, 43 REHABIL. PSYCHOL. 118, 123–25 (1998). Those characterized on yet another set of inventories as "resilient" and those characterized as "undercontrolled" do well while those characterized as "overcontrolled" do poorly according to yet another study. *See* J.W. Berry et al., Res*ilient, Undercontrolled, and Overcontrolled Personality Prototypes Among Persons with Spinal Cord Injury*, 89 J. PERS. ASSESSMENT 292 (2007).

[182] It is quite clear that many of the bad reactions to SCIs noted in the existing literature involve bad reactions to pain. There is little reason to believe, though, that reactions to the pain associated with a failed revision would be different than reactions to the chronic pain associated with arthrodesis. For an article focused most explicitly on pain, see Raichle et al., *supra* note 181.

[183] *See* A. El-Kordi et al., *A Single Gene Defect Causing Claustrophobia*, 3 TRANSL. PSYCHIATRY 254 (2013).

[184] There is certainly a literature that implies both that individual differences in pain sensitivity are significantly produced by genetic distinctions and that these genetic distinctions may be observable but, again, my weak sense is that few believe that, right now, we could readily sort out patients in terms of genetic vulnerability to pain. For a good, though older, literature summary, see J.S. Mogil, *The Genetic*

issues, closely associated with a literature that purports to explain observable distinctions in pain sensitivity, on the basis of genetic factors, environmental factors, and a host of personality traits.[185] Suffice it to say, though, there are certainly good reasons to believe that people who are atypically sensitive to some sorts of pain are not necessarily sensitive to other forms of pain, so that discovering that a person tolerates pain poorly in one diagnostic setting may not predict how poorly he will tolerate the pain associated with the arthrodesis.[186]

5. Reactions to Limping

Once more, it would be helpful if we could identify traits associated with better and poorer adjustment to two aspects of the limping[187] that will almost inexorably result from an arthrodesis. First, limping modestly impacts physical function, and second, those who limp may draw adverse, stigmatizing attention for their physical differences.[188]

Mediation of Individual Differences in Sensitivity to Pain and Its Inhibition, 96 PROC. NATL. ACAD. SCI. U.S.A. 7744 (1999). For one typical effort to identify the small number of genes associated with atypical vulnerability to pain, see L. Diatchenki et al., *Genetic Basis for Individual Variations in Pain Perception and the Development of a Chronic Pain Condition*, 14 HUM. MOL. GENET. 135 (2005). For a review article that describes efforts to identify the multiple genetic influences on pain sensitivity as "in its infancy," see E. Young et al., *Genetic Basis of Pain Variability: Recent Advances*, 10 J. MED. GENET. 1136 (2011).

[185] A good summary of the literature on individual differences in pain tolerance can be found in C.S. Nielsen et al., *Individual Differences in Pain Sensitivity: Measurement, Causation and Consequences*, 10 J.PAIN 231 (2009). The authors report not only something fairly obvious—some clinical conditions are experienced as more painful than others—but note the more important point for these purposes, which is that the variability in pain ratings of patients with the same disease or trauma is enormous. *Id.* at 231-32. Distinctions in some real phenomenon—such as "pain sensitivity"—rather than mere distinctions in reporting account for a substantial portion of these differences. *Id.* at 232. Pain sensitivity can be estimated through the use of well-controlled experimental pain stimuli. *Id.* Pain sensitivity estimates show substantial heritability but equally important environmental effects. Quite important for our purposes, the genetic and environmental factors that influence pain sensitivity differ across pain modalities. For example, genetic factors that influence cold-pressor pain have little impact on phasic-heat pain and vice versa. *Id.* at 234. Measures of pain sensitivity are predictive of acute postoperative pain, and there is preliminary evidence that heightened pain sensitivity increases risk for future chronic pain conditions. *Id.* at 235. At this time, however, it is unclear which experimental pain modalities should be used as predictors for reactions to future pain-producing conditions.

The problem of estimating likely reactions to the pain associated with arthrodesis is harder still if pain levels are substantially mediated by factors that may themselves change over the course of a person's life or vary a good deal from situation to situation. There appears, for instance, to be an association between acute stress reactions and pain, and it is plausible that vulnerability to acute stress varies substantially over the course of a lifetime, although it is not clear to me that this is the case. The relationship between stress and pain is explored in E. Vachon-Presseau et al., *Acute Stress Contributes to Individual Differences in Pain and Pain-Related Brain Activity in Healthy and Chronic Pain*, 33 J. NEUROSCI. 6826 (2013).

[186] Nielsen el al., *supra* note 185, at 232, 234–35.

[187] It is not clear whether reactions to these sorts of changes depend significantly on whether there are *both* functional and appearance shifts. One study finds, for instance, that levels of PTSD following the loss of fingers are insensitive to the question of whether the loss compromises function. *See* J. Fukuhishi, *Relationship of Cosmetic Disfigurement to the Severity of Posttraumatic Stress Disorder in Burn Injury and Digital Amputation*, 68 PSYCHOTHER. PSYCHOSOM. 82 (1999).

[188] There is substantial evidence that those with pronounced physical differences from the statistical norm are stigmatized by many others. For instance, people are less likely to help strangers in plain need of aid

There is, as best as I can ascertain, no literature that is directly on point on this topic, but there is a good deal of literature on cognate issues. There are, for instance, studies of the traits purportedly associated with reacting better or worse to disfiguring changes in facial appearance or to amputations that impact both function and appearance.[189] I am not certain the studies are of much use because these life changes are significantly distinct from developing a post-surgical limp in a host of ways. For instance, amputation and disfigurement may impact both functioning and appearance more than limping does, and data suggesting the severity of injury has little impact on psychological reactions to disfigurement may not extend to situations in which the severity of injury or disfigurement is markedly lower still.[190] Moreover, both amputation and disfigurement may often occur as a result of traumatic injury, so there may be independent PTSD and particular sorts of occasions for recrimination against injurers or self-blame for risk-taking. On the other hand, in this decision-making context, patients will not limp as a result of traumatic injury.[191] Facial disfigurement may be more prone to destabilize identity to the extent that facial appearance and identity are closely intertwined[192] and amputation may be associated with a loss of bodily integrity;[193] once more, that is not plainly germane to this case.

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when those strangers appear disfigured. *See* R. Bull & J. Stevens, *The Effects of Facial Disfigurement on Helping Behaviour*, 8 ITAL. J. PSYCHOL. 25 (1981).

As always, the already-complicated issue of assessing distinctions in reactions each patient is prone to have to "looking different" is made even more complex by the fact that some substantial proportion of patients considering these operations may "look different" whether they have hip problems or not, since a substantial proportion are quite overweight. We are asking, in a sense, not just whether the patient is relatively vulnerable to or relatively immune from the stigmatizing "gaze" of those around him, but whether limping will substantially increase his vulnerability to that gaze.

[189] People stand further away from people who are disfigured than those who are not. *See, e.g.*, N. Rumsey et al., *The Effect of Facial Disfigurement on the Proxemic Behaviour of the General Public*, 12 J. APPL. SOC. PSYCHOL. 137 (1982). More generally, people with disfigurement report a good deal of difficulty in social encounters. *See, e.g.*, S. Jowett & T. Ryan, *Skin Disease and Handicap: An Analysis of the Impact of Skin Conditions*, 20 SOC. SCI. MED. 425 (1985); S.W. Lanigan & J.A. Cotterill, *Psychological Disabilities Amongst Patients with Port Wine Stains*, 121 BR. J. DERMATOL. 209 (1989).

[190] For a summary of studies that find that the objective extent of disfigurement does not impact psychological reactions, see J. Ong et al., *Does Severity Predict Distress? The Relationship Between Subjective and Objective Measures of Appearance and Psychological Adjustment, During Treatment for Facial Lipoatrophy*, 4 BODY IMAGE 239 (2007). Studies of patients with the same underlying disfiguring disease also typically find no relationship between disease severity and psychological outcomes. *See, e.g.*, A.B. Fleischer et al., *Disease Severity Measures in a Population of Psoriasis Patients: The Symptoms of Psoriasis Correlate with Self-Administered Psoriasis Area Severity Index Scores*, 107 J. INVESTIG. DERMATOL. 26 (1996); A.R. Thompson et al., *Living with Vitiligo: Dealing with Difference*, 7 BR. J. HEALTH PSYCHOL. 213 (2002).

[191] There is reason to believe that patients who experience changes as a result of disease—as do the patients making the surgical choice here—do better, all else equal, than those who were injured by others or in accidents for which they might be responsible. For a literature review dealing with this, and other issues, in relationship to facial disfigurement, see A. Desousa, *Psychological Issues in Acquired Facial Trauma*, 43 INDIAN J. PLAST. SURG. 200 (2010). The discussion of the impact of the traumatic origin of the facial injuries is discussed *id.* at 202–03.

[192] *Id.* at 200.

[193] Some authors claim that some of the cultural distinctions in reaction to amputation are caused by distinctions in beliefs about the extent to which the loss of a body part compromises one's wholeness as a

The literature may also be far less than ideally helpful because the "risk" factors for adverse reactions to these sorts of changes may be both too vague and, more importantly, incapable of doing the key work of differentiating reactions to limping from reactions to middle-aged immobility. The risk factors—most especially factors like a history of depression or substance abuse,[194] inadequate social support, narcissistic preoccupation with appearance,[195] high levels of timidity (rather than assertiveness) and preoccupation with social standing (rather than feelings of self-worth),[196] a tendency to respond to problems by avoidance or denial rather than taking active problem-solving steps[197]—seem at the very least like risk factors for adverse reactions to wheelchair-reliance and perhaps even like risk factors for bad psychological outcomes across the board rather than factors specifically associated with bad reactions to limping.

There are, then, possible proxies for ideal, non-myopic tastes. It *is* plausible that the arthrodesis is substantially more likely to be the ideal choice for some parties than others. Most obviously, it is more ideal for a party at greater risk of requiring a revision procdure, but it is also more ideal for a party who is more pain tolerant, more risk-averse, more averse to wheelchair-reliance, and less averse to limping. Our capacity to observe and quantify each of these traits individually, though, seems quite weak, and it appears harder still, at this juncture, to construct an index that weighs, for instance, a "high" degree of pain tolerance against a "high" degree of aversion to limping. The difficulty of observing and quantifying proxies may prove significant when we consider what to do with the information we can gather about these proxies.

D. Potential Policy Responses to Patient Traits

Assume first that we believe we have observed a set of traits in Patient 1 more consistent with selecting the immediate THR, and then that we have observed traits in Patient 2 more consistent with selecting the arthrodesis as an idealized choice. Assume, too, that we believe that the myopic and deficient adolescent decision-maker, without respect to these traits, will choose the THR if his or her myopia determines or strongly influences his or her decision. How should we proceed?

It seems theoretically plausible, but highly undesirable, that patients with a particular trait set would be directed to have one operation rather than the other (though they still obviously must consent to that operation, rather than doing nothing). This

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person. *See* C.G. Bhuvaneswar et al., *Reactions to Amputation: Recognition and Treatment*, 9 J. CLIN. PSYCHIATRY 303, 306 (2007).

[194] *See, e.g.*, S. Islam et al., *The Association Between Depression and Anxiety Disorders Following Facial Trauma— A Comparative Study*, 41 INJURY 92 (2010).

[195] *See* R.L. Frierson & S.B. Lippmann, *Psychiatric Consultation for Acute Amputees*, 28 PSYCHOSOMATICS 183 (1987).

[196] *See, e.g.*, LAWRENCE W. FRIEDMAN, THE PSYCHOLOGICAL REHABILITATION OF THE AMPUTEE 17–67 (1978).

[197] For a discussion of the perils of passivity in dealing with amputation, see Bhuvansewar, *supra* note 193, at 306. For a related finding in relationship to disfigurement, see S.M. Auerbach et al., *Psychological Factors Associated with a Response to Maxillofacial Injury and Its Treatment*, 66 J. ORAL MAXILLOFAC. SURG. 755, 758–60 (2008) (demonstrating that patients using emotion-focused coping strategies—strategies that give them more control—do better psychologically than those who focus on altering situations, which they actually cannot and do not do much to alter).

represents the *hard* paternalist solution. Or, do patients instead simply have to jump through more hoops to get the operation that is not indicated by their observable traits? (We could think of this as a form of penalty or nudge that functions in part in much the way that any increase in price works to depress demand and in part by communicating, albeit implicitly, that the doctor thinks the option the patient is drawn to choosing is an unwise or at least unconventional one). Or do patients get nudged in some other way towards the "indicated" surgery (e.g., the indicated surgery is described in great detail and the alternative operation is merely mentioned unless the patient presses to learn more about it)? These actions represent the *soft* paternalist solution. Finally, should surgeons instead simply spend more time explaining to patients and parents not just purely medical information about the two operations and their expected medical outcomes in the course of getting informed consent to a treatment course, but also explain the relevance of the proxies to the stable and prudent tastes of patients that they are taught to observe? Obviously, the last of these solutions which I would describe as *paternalistic guidance* is most consistent with a commitment to higher levels of ultimate patient control over their own health care decisions.

Unless one believes that one's "trait index" is enormously powerful in predicting "ideal" choices, it seems that there is little reason to use hard paternalist interventions that force Patient 1 either to pick the immediate THR or forego treatment altogether. The case for preferring soft paternalist nudges to mere paternalistic guidance is more complex; it is grounded in the observation that myopia may be so recalcitrant that mere paternalistic guidance is inadequate.[198] But the practice of using such nudges is bedeviled by the difficulty of figuring out what sorts of soft paternalist nudges to use.[199]

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[198] As I argued above, I think there are strong reasons to embrace the proposition that the adolescent decision-maker here will scarcely consider the interests of his or her middle-aged self directly and that, unlike in the cases of acquiring human capital for the future or smoking, there are no presently operative norms to influence behavior in a fashion that actually accounts for the future self.

[199] Certainly, if we are fixed above all on the ease of administration of a policy instrument, we should be strongly drawn towards simply reconstructing the typical shared decision-making process to ensure that the doctor not only provides technical information about the probabilistic distribution of distinct physical outcomes but also measures and discloses all the externally discernible relevant traits and emphasizes why she has measured them and believes them relevant.

But if one believes myopia is powerfully distorting, this may seem inadequate: adolescent patients will ultimately ignore the virtues of arthrodesis because these virtues manifest themselves too far in the future. One might then argue, across the board, for defaulting to the arthrodesis, likely as part of a process in which one explores those traits the patient possesses that push both towards and away from that decision, even if one believes it is frequently or even usually the wrong choice, because the default does no more than counterbalance the myopic preference. I confess that I remain a bit unsure on what a "default" in the context of requiring active consent to any treatment actually will look like. In many of the opt-in/opt-out settings, it is simple to see how a default is set: when one gets a driver's license, the application simply says, "I agree to donate organs unless I check a box that says I do not," instead of saying, "Check this box if you want to donate organs." I am not at all sure there is a moment in the informed-consent process that looks much like this. Plainly, we would not ask the patient to consent to the arthrodesis and then check a box if he'd also like to *learn* about the THR: a doctor who did that would plainly violate information-sharing obligations. But once the physician informs the patient about both options, I am not sure what it means to say, "Here's the one you consent to if you say nothing further, though, you can choose the other." I expect a default in this context has something to do either with the attitude the physician expresses towards the favored and disfavored operation, or the relative time and effort the patient must spend before he or she is allowed to consent to each procedure.

It would make a good deal more sense to say that if Patient 1, whose "traits" suggest that he or she pick the THR, nonetheless chooses the arthrodesis, acting against his or her deficient myopic preferences, Patient 1 is likely aware of his or her own idiosyncratic tastes or circumstances that are simply not captured by our inevitably imperfect proxies, so that we should back away from either hard or soft paternalism. It is a harder question as to whether to use what I have called "paternalistic guidance" to push back against the non-myopic choice to get the arthrodesis—that is, sharing information not just about the expected technical outcomes of surgery but information about what the doctor believes he or she may know about people "like" the patient and how they have reacted to distinct outcomes, on the theory that the patient may have less self-knowledge about these unfamiliar issues and reactions than would be ideal.[200] It is plausible too that we simply allow Patient 1 to make his or her preferred choice, doing no more than one would do in any surgical setting (giving information about risks and expected outcomes

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For example, a default with a "choice architecture" designed to make the default sticky might involve requiring that those who want the disfavored operation must get the operation after a waiting period, or may get it only if they have passed a test to make sure they understands the consequences of their decision, or they must go through more counseling if they want the non-preferred choice. In this sense, carrying a pregnancy to term is made more of a default, if not a full-blown default, in states with legislatures that are trying to reduce abortion rates using various soft paternalist tools, given their constitutional inability to ban them.

While it is not clear that we should use defaults to nudge a person toward choices that are presumed to be the poorer choice in most cases, as the arthrodesis might well be, we might do so on the assumption that we only want those strongly committed to the non-default position to make that choice, even though we believe that a majority of choosers will and should manifest such strong counter-default positions. One might believe, for instance, that even the "idealized" adolescent decision-maker would choose, on proper reflection, to post online pictures of him- or herself available only to "friends" in which the adolescent is using alcohol or recreational drugs or post pictures that could be described as sexual, but that such pictures would best be "recognized" and blocked *in the first instance*—requiring the would-be poster to jump through hoops to avoid the default that the pictures not be posted at all—because we believe that they should not be posted by those not committed enough to doing so to expend the time and energy to work around the defaults.

[200] I do understand that it can be hard to distinguish between paternalistic guidance and nudges. When abortion opponents seek to mandate exposure to what they see, correctly or not, as relevant and true information about the likelihood of seriously regretting decisions to have abortions and suffering adverse mental-health consequences from the decision to abort, it is not clear whether we should describe them as "nudging" people towards carrying to term (because the decision to carry to term does not carry with it the cost of being exposed to an argument against your initial decision by an authority figure) or should be described as an effort at giving paternalistic guidance. For a description (and critique) of mandatory counseling laws focusing on the psychological impact of abortion, see Ian Vandewalker, *Abortion and Informed Consent: How Biased Counseling Laws Mandate Violations of Medical Ethics*, 19 MICH. J. GENDER & L. 1, 15–18 (2012).

The reason I think that my proposal here is more plainly "paternalistic guidance" than mandatory "regret counseling" is that women seeking abortions understand perfectly well that messages about the suffering they are likely to feel if they choose to get an abortion are tinged with moral disapproval so that they will need to take the active "hoop jumping" step of countering disapproval should they go ahead with the abortion. The disapproval may be attributed to the doctor in the room; it should surely be attributed to the legislature that mandated the disclosures. In the surgical case we have focused upon, I am modestly confident that a patient who was told, for instance, that he or she has an unusually low tolerance for the pain that will accompany the arthrodesis so that he or she may want to reconsider his or her decision to choose that operation will not believe he or she is being scolded.

of the operation and the credible treatment alternative and discussing with the patient how he or she is processing and reacting to the information).

On the other hand, some form of intervention is almost surely warranted for Patient 2, who has observed traits more consistent with selecting the arthrodesis as an idealized choice. I would be prone to rule out hard paternalism here even setting aside the merits of across-the-board absolutist opposition to hard paternalism generally or hard paternalism in relationship to health care decisions in particular. It seems inconceivable to me that we would ever be confident enough about the relationship between any of the individual factors we may observe and "idealized" reactions to each operation, much less confident about how to construct an aggregated index that tells us not just that Patient 2 has *traits* that make the arthrodesis the idealized choice but that his or her array of traits, each held to a lesser or greater degree on a continuum, add up in a fashion that strongly suggests a particular outcome.

This is true in part because it seems fanciful to imagine that we have defined what an idealized decision is in a general sense. We know, for instance, it is *not* simply the choice that he or she would think best on his or her death bed or the choice that someone strongly altruistically linked to him or her would make if that person could accurately foretell the patient's hedonic state following each operation for the remainder of his or her life. If nothing else, both these perspectives suffer from hindsight bias: knowing the outcome of a decision made under uncertainty alters one's sense of what the best decision was at the time it was made.[201] But the substantial conceptual problem of *defining* an idealized choice still seems small compared to the problem that the weighing that goes into the construction of any plausible index will inevitably, at best, do no more than reflect commonplace trade-offs, while even the non-myopic version of Patient 2 may not make those trade-offs in a commonplace way.

Still, if one takes this patient's deficiencies as a decision-maker seriously enough, it makes sense either to embrace soft paternalism or, at a minimum, paternalistic guidance. I recognize that it is easier to identify objective traits that allow us to infer that a person is permitted to make a choice that is generally forbidden because most who make that choice do so because their choice-making capacity is compromised than to use observable proxies to select a good choice, as we must here.[202] Either solution still

[201] Hindsight bias—the illusions both that outcomes that eventuated were more probable *ex ante* than they actually were and the illusion that one knew all along what would happen—was discussed initially in B. Fischoff, *Hindsight ≠ Foresight: The Effect of Outcome Knowledge on Judgments Under Uncertainty*, 1 J. EXP. PSYCHOL. HUM. PERCEPT. PERFORM. 288 (1975). Qualifications and criticism of the usual framework for analyzing hindsight bias are presented in M.G. Kelman et al., *Decomposing Hindsight Bias*, 16 J. RISK & UNCERTAINTY 251 (1998).

[202] I already discussed two legal regimes (assisted suicide and pension-savings withdrawal) in which we use observable proxies to immunize a subset of the population from following generally applicable paternalistc rules. There are plainly other legal interventions—proposed or actual—in which we look not to the party's expressed preferences but to objectively observable circumstances to grant waivers from the ordinary paternalist regime. For instance, we may believe that myopic borrowers who take on home mortgages with steeply escalating interest rates or balloon payments either make the same mistake that under-savers make—failing to do what they should do to have the same amount of resources available for non-housing goods over the course of their lifetime—or, like those who ignore future selves entirely, simply fail to envision the time when they will need to pay out more. We may also believe that these borrowers are deficient in that they suffer from undue optimism bias (just as adolescents may over-optimistically assess

permits a patient with strong commitments to the THR to make that decision. We may treat the patient as demonstrating an especially strong commitment to the THR merely by virtue of the fact that he or she has overcome the hurdles that the "nudge" towards the arthrodesis is meant to impose, and we might also think that the delays that inevitably accompany working around the doctor's nudge give the patient a chance to reflect on the wisdom of the decision. Neither of these propositions is transparently true, though. It may well be that those who work around defaults and obstacles are simply more efficacious in getting their way, rather than more committed to their decision, and it may well be that people do not reflect more when seeking to overcome obstacles but get fixated on the steps they need to take to sidestep the stumbling blocks.

Whether paternalistic guidance can do much to withstand the myopic decision-maker's indifference to his or her distant future is not at all clear to me. It is hardly an established proposition that the adolescent patient will be any more attentive to seemingly detailed information about how the patient's own traits relate to his or her likely future feelings and reactions than he or she would be attentive to the more generic message given in conventional consults with no paternalistic intentions that the patient is risking wheelchair-reliance in middle age, and that he or she should think of that as a cost of the immediate THR when making the decision. The intuition behind the proposition that the patient will be more attentive is that the doctor has engaged him or her more concretely and less generically, and that one of the reasons that adolescents discount their future selves so much is that those selves are abstract, generic, and are not explicitly tied to them as unique, richly textured individuals.[203]

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the probability of medical progress that will render everything from their decisions to get THRs to their decisions to smoke "deficient"). At the same time, we may believe that a subset of borrowers possessing certain observable traits may rationally expect steep increases in income so that the escalating payment schedule (or balloon payment) does not threaten uneven consumption paths or foreclosure.

For an excellent discussion of the ways in which many borrowers in the market for non-traditional mortgages might be understood to be deficient decision-makers, see Lauren E. Willis, *Decisionmaking and the Limits of Disclosure: The Problem of Predatory Lending: Price*, 65 MD. L. REV. 707 (2006). It is plausible that we could adopt a variety of hard or soft paternalist policies to deal with such defects. For instance, we could simply put hard caps on the extent to which future obligations could exceed current obligations (hard paternalism) or attach scary warnings to all loans with escalating payments. Nonetheless, there are plainly people for whom taking on escalating payments would not only pose little risk but would serve to smooth lifetime consumption rather than make it uneven—those whose income some years after loan origination will rise—and it is plausible to say that we will try to identify such people based upon objective factors rather than self-selection and allow *them* (but them alone) to be free from the hard or soft paternalist regime. Again, identifying proxies for "adequate certainty of rising income" would not be easy; the fact that being the beneficiary of an irrevocable trust that will not kick in for a few years is a truly easy case and that medical school residency seems pretty simple too does not mean that we can readily assemble a sensible list that is not under-inclusive and hard to defend.

[203] This is the lesson I draw from the work most closely associated with Liberman et al., *supra* note 119, and other work cited *supra* in notes 131 and 134. But it is not at all clear that one can draw from that work the conclusion that one can do anything about our natural, general tendency to be abstract about our future selves by trying to give a more concrete, detailed view of the more specific traits the future self is likely to exhibit in increasingly richly evoked contexts. So if the problem is that the adolescent patient generically thinks the middle-aged self will be just fine in a wheelchair because he thinks that a generic person who is good at coping with adversity would be, it is unclear that we could solve that problem—and make him see how someone like him will react to restricted mobility options—by having him work with a profile, a

It is also conceivable that just as we attempt to observe traits associated with particular substantive surgical decisions, we could observe traits associated with greater and lesser degrees of myopia. One could imagine thinking that for the subset of patients who reveal lower rates of myopia, one can and should move further away from even soft paternalist interventions toward either what I have been calling paternalistic guidance or toward permitting more conventional medical choice-making in which the patient is given full discretion, once informed about medical facts, to reach a decision, whether in ongoing dialogue (as in the shared decision-making ideal) or simply after receiving relevant technical information. There are certainly simple ways of testing whether people think of the future self as more like a different person, rather than as closely connected to the present self, and measurements of this trait appear to have behavioral salience. Those who are more connected to a particular instantiation of a future self, believing that self to be more similar to the present self than typical subjects, are, for instance, less prone to discount future income or utility as much for that self.[204] Naturally, if we could identify decision-makers less prone to make the worrisome deficient choices that motivate the soft paternalist or paternalistic guidance interventions, we could more readily revert in those cases to the assumption that the self-interested decision-maker is best positioned to make the ideal choice in a world of acceptable heterogeneity.

V. CONCLUSION

There may well be a technological fix to this THR/arthrodesis surgical decision-making problem. If the risk of middle-aged immobility declines to very low levels because of improvements in both initial hip replacement surgery and revisions, then an adolescent's decision to choose the immediate THR over arthrodesis would be an easy one. Many doctors we surveyed plainly believe the technological fix is already here; they

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profile elicited through specific observations of him as an individual, of people reacting to that very specific outcome.

[204] *See* D.M. Bartels & L.J. Rips, *Psychological Connectedness and Intertemporal Choice*, 139 J. EXP. PSYCHOL. 49, 51–54 (2010). Bartels and Rips also find that when people imagine someone undergoing a huge life change that undermines what they see as psychological continuity—such as a shift in personality traits, values, or beliefs—they believe that such a person should discount future benefits and delay experiencing costs. *Id.* at 57–59. Interestingly, though, there is little evidence that people who more globally describe themselves as more connected to their future selves—that is, those who believe their future self will share vital psychological traits with their current self—discount the future any less. *Id.* at 54. The finding that global evaluations of connectedness to the future self has no impact on discounting echoes the findings reported in Shane Frederick, *Time Preference and Personal Identity*, *in* TIME AND DECISION 89 (George G. Loewenstein et al. eds., 2003).

Bartels and Rips do indeed replicate Frederick's finding but claim that the finding is of little interest in that different subjects use the scale "how much are you like your future self" differently and that, to avoid interpersonal distinctions in scale use that just create noise, it is best to see whether discounting practices shift within individuals for different portions of their lives. The question they are asking, at core, is whether a particular subject *S* lowers his or her discount rate during the intervals of his or her life when he or she expects the most continuity. Bartels & Rips, *supra*, at 54. Even if they are right—and we know that "connectedness" does impact discounting—it makes the task in the surgical decision-making case more difficult, as it implies that there is no good, interpersonally valid way of observing degree of connectedness to a future self. Of course, it is *distinctions* in that degree of connectedness that we are seeking to measure.

believe the risk of revision (let alone unsuccessful revision) is already quite low given recent technical advances.

But even if it were the case that this particular surgical choice could eventually be made rather readily, the decision-making problem I have tried to model in this paper would still remain an important one, in medical and non-medical settings alike. There are many circumstances in which we face tough choices, in which we should expect heterogeneous decisions, but cannot fully trust the party most affected by the choice to make a prudent decision. In each such case, we must consider the possibility of searching for objectively observable proxies for the preferences the "non-deficient" self would manifest and then decide, having observed the traits, whether to mandate a particular choice (*hard paternalism*), "nudge" towards that choice (*soft paternalism*), or give the decision-maker information not only about decision-relevant circumstances external to him or her, but information about what we believe to be decision-relevant traits that he or she possesses (mere *guidance paternalism*).

Doctors and patients must, for instance, make decisions about whether to manage pain aggressively, aware that aggressive pain management may lead to addiction. Trading off the risk of future harm against current benefit is indubitably tricky in any case, but worse still, some of the patients who might seek aggressive pain management are either already addicted to pain medications or are myopic about the impact of future addiction, and would choose aggressive pain treatment as a result of their deficient decision-making capacity, rather than their especially high need for pain relief.[205] Were we able to observe vulnerability to addiction and both pain and pain sensitivity, we might better respect the idealized heterogeneous choices of patients, rather than their actual ones.

Regulators who are especially wary of the decision-making competence of investors may believe that aggressive day trading strategies are not only strongly expected to be unprofitable (trading fees wipe out expected gains) but that they are almost invariably employed by deficient decision-makers suffering from a range of cognitive biases.[206] Still, we may be able to use hard or soft paternalist strategies to

[205] There are plainly many medical procedures in which there are immediate gains (as the immediate THR gives immediate relief) and long-term risks (as the THR arguably poses) or simply trade-offs between benefits and side-effects that are more or less likely to occur. Think, for instance, of hormone-replacement therapy for menopausal women (short-term benefits, long-term risks) or the use of methotrexate to alleviate the symptoms of rheumatoid arthritis (short-term benefits, a mix of moderate, immediate side-effects that range from improbable to likely and both short- and long-term serious risks). And it is certainly the case that patients differ in what I called "objective circumstances" in ways that would lead doctors to alter therapeutic recommendations based on distinctions in the probability of particular outcomes. So, for instance, a rheumatologist might well be less prone to prescribe methotrexate to a patient with lung problems because the chances of a serious adverse side-effect are higher than they would be for typical patients, just as some orthopedists would be less prone to recommend the THR for a would-be manual laborer, believing the risk of immobility in middle age to be higher for such patients. But these cases still differ significantly from our core cases, both because much of the expected heterogeneity in decisions comes from distinctions in risk profiles rather than subjective reactions to known outcomes and because the patients are likely reasonably prudent when asked to make judgments about treatment course.

[206] For an argument to the effect that day-trading is a product of decision-making defects, see Russell, *supra* note 44, at 551, 567–68. Russell relies to some considerable extent on studies finding that day-traders systematically lose money because of their heavy trading, despite their belief that they are especially astute traders. "According to the best empirical estimates, average individual investors underperform the market by 1.5%, and the most active ones (the top quintile by turnover) by 6.5 percent." *Id.* at 566. Only 1% of

diminish the incidence of day trading while still attempting to observe traits in people that permit us to allow some individuals (without soft or hard paternalist interventions) for whom churning stocks or exercising what they may mistakenly see as their unique capacity to beat the market has a consumption value that, given their economic circumstances, outweighs the losses they suffer.

The particular decision I have focused most closely on—the decision an adolescent patient with end stage hip disease must make between getting a THR immediately or getting arthrodesis that will likely be converted to a THR later in life—remains one of the toughest to manage intelligently. I believe that the decision is indeed a difficult one, not simply because the outcome of the THR is highly uncertain, but because the gains and losses from each decision are difficult to compare and because they occur at such different points in time. I believe further that there are legitimate distinctions in both vulnerability to the particular bad outcomes of each operation and taste that make it unlikely that there is a single best answer across patients. And while I think adolescents are generally competent medical decision-makers, I believe there is strong reason to suspect they are too myopic to make this decision prudently. What makes this an especially thorny problem, though, is that the myopic decision may be the right one in many or most cases. In the typical case in which we employ some kind of paternalist intervention while trying to account for heterogeneity, the decision that results from defects in competence is most often a bad decision, and we need only look to observe the atypical situations in which it may be permissible to make a decision that is ordinarily bad.

Moreover, these "atypical situations" often have few features and here, in selecting the appropriate hip surgery, a decision may be good or bad depending on a wide variety of factors. We may, for instance, permit suicide only on the very rare occasions when the party seeking relief from the ordinary hard paternalistic prohibitions has one of a very small number of traits. And the party who is immune from the soft paternalist nudge to retain pension savings in the face of myopic temptation to over-consume in the present may gain his or her immunity because he or she is in one of a small number of objectively observable circumstances that permit us to conclude that the utility he or she would gain from spending now outweighs the utility he or she would gain by deferring the spending.

On the other hand, to determine that an adolescent "should" get the THR (or the arthrodesis) based on his or her objective traits requires developing a complex index of traits, none of which is easily measured nor readily traded off one for the other. Solving this problem is a very daunting task, and it is likely impossible if one expects a perfect solution. I am not certain by any means that I believe surgeons should re-orient their

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day-traders in another study carry a profit, and the more active they are, the worse they underperform. *See* B.M. Barber et. al., *The Cross-Section of Speculative Skill: Evidence from Day Trading*, 18 J. FIN. MKTS. 1, 3 (2014). Barber and Odean, the two finance professors who have made the most contributions to the study of day traders, put the results succinctly in one of their titles, *Trading Is Hazardous to Your Wealth*. *See* B.M. Barber & T. Odean, *Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors*, 55 J. FIN. 773 (2000) (demonstrating that day traders earn less, net of the high transaction fees that stock churning generates and dismissing all explanations for stock churning other than defects in rationality that arise from overconfidence).

approach to patients in this situation by offering what I described as paternalistic guidance. But I believe that forcing the patient to learn more about traits he or she possesses (e.g., pain tolerance, likely response to changes in appearance) that are relevant to how he or she will come to evaluate the outcomes that either will occur or might occur depending on the operation that is chosen will ultimately benefit the patient over the course of his or her whole lifetime.