

The Puzzle of Male Chronophilias

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Abstract In this article, I return to the idea that pedophilia, a sexual interest in prepubescent children, can be considered a sexual orientation for age, in conjunction with the much more widely acknowledged and discussed sexual orientation for gender. Here, I broaden the scope to consider other *chronophilias*, referring to paraphilias for age/maturity categories other than young sexually mature adults. The puzzle of chronophilias includes questions about etiology and course, how chronophilias are related to each other, and what they can tell us about how human (male) sexuality is organized. In this article, I briefly review research on nepiophilia (infant/toddlers), pedophilia (prepubescent children), hebephilia (pubescent children), ephebophilia (post-pubescent, sexually maturing adolescents), teleiophilia (young sexually mature adults, typically 20s and 30s), mesophilia (middle-aged adults, typically 40s and 50s), and gerontophilia (elderly adults, typically 60s and older) in the context of a multidimensional sexual orientations framework. Relevant research, limitations, and testable hypotheses for future work are identified.

Keywords Age preferences · Chronophilias · Paraphilias · Sexual orientation

Introduction

Sexual orientation is usually used to refer to one's attractions to individuals of the opposite and/or same sex, or both. Indeed, the American Psychological Association specifically defines sexual orientation in this way (<http://www.apa.org/pi/lgbt/resources/sexuality-definitions.pdf>), which is also consistent with the Oxford Dictionary definition of the term as well as common usage (<https://www.oxforddictionaries.com/definition/english/sexual-orientation>):

Sexual orientation refers to the sex of those to whom one is sexually and romantically attracted. Categories of sexual orientation typically have included attraction to members of one's own sex (gay men or lesbians), attraction to members of the other sex (heterosexuals), and attraction to members of both sexes (bisexuals) (American Psychological Association, 2011).

In this article, I more broadly define sexual orientation as a stable tendency to preferentially orient—in terms of attention, interest, attraction, and genital arousal—to particular classes of sexual stimuli (see also Chivers, 2015; Sell, 1997). If we accept this broader definition, then we can imagine that individuals actually have multiple sexual orientations rather than a single sexual orientation, corresponding to their sexual preferences along a variety of different dimensions, including age. This article focuses on variation across age categories.¹ Money (1986) coined the term chronophilia to refer to paraphilias (variations from teleiophilia, the species-typical age orientation to sexually mature adults) regarding different age (maturity) categories; thus, this article focuses on the puzzles posed by chronophilias, including questions about etiology and course, how chronophilias are related to each other, and what they can reveal about the organization of human sexuality.²

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¹ I use the term age throughout this article, but, as I discuss later, I am actually referring to sexual and physical maturity stages. Age is a useful but not perfect proxy for maturity stage.

² I am interested in both male and female sexuality, but so little is known about variations in age preferences among females that this review necessarily focuses on male chronophilias.

Because there are robust gender differences in how sexual orientation is expressed, and especially because there is almost no research on chronophilias among women, this review necessarily (but grudgingly) focuses almost entirely on research involving male participants. The absence of research on chronophilias among women suggests a much lower prevalence, but there is also a lack of attention to sexual variation in women outside of gender orientation.

In the following sections, I discuss how to assess and operationalize sexual orientation, propose a multidimensional framework for thinking about sexual orientations beyond gender or age, and then review what we know about different chronophilias, emphasizing those chronophilias other than pedophilia (already covered in Seto, 2008, 2012, 2013). I conclude with testable ideas about chronophilias and suggestions for future directions in research on sexual age orientations.

Sexual Orientation

The simplest method of assessing sexual orientation involves self-reported information obtained via interview or questionnaire. There is also a great deal of attention directed to more objective methods relying on genital response or cognitive processes (e.g., visual reaction time) because of concerns about the vulnerability of self-report when serious legal or social stakes are involved, as in the case of pedophilia. Recent reviews on assessment methods for detecting variant age preferences for prepubescent or pubescent children are available in Seto (2008, 2009, 2013; see also Cantor & McPhail, 2015). Behavior is the most constrained indicator of sexual orientation, because it is limited by opportunity and willingness or ability to act upon one's orientation. For example, someone could have a same-sex orientation in terms of their attraction as expressed in sexual thoughts, fantasies, and urges, but never act on that orientation because of legal or social prohibitions against same-sex sexual behavior. Similarly, some individuals with a particular chronophilia may never act on it (e.g., pedophilic men who have not committed contact sexual offenses involving children), whereas others who have engaged in indicative behavior nonetheless do not have the sexual preference (e.g., some men have committed sexual offenses against children or used child pornography without being pedophilic). I have estimated that approximately half of male sex offenders with child victims are pedophilic; the rest are nonpedophilic men who offended for other motivations, such as antisocial individuals who opportunistically offend when seeking sexual gratification (Seto, 2008).

Pornography is an interesting behavioral window into atypical sexual interests, including chronophilias, because it is less constrained by opportunity than any sexual activities involving other persons. Someone without access to persons of a particular maturity status, or who has access but is constrained morally or by fear of legal or other consequences, would not engage in direct sexual

contact, but they might still go online—where most pornography is accessed nowadays—and seek out relevant erotic content. Pornography depicting adults of any age is often legally available; however, pornography depicting persons under the age of 18 is illegal in many jurisdictions, including Canada and the United States, making it more difficult to ascertain interest in pornography depicting these age ranges (see Seto, 2013).

Unfortunately, much of the research that has been conducted on sexual age preferences has focused on behavior such as sexual contacts with children or use of child pornography rather than attention, interest, or attraction. This is influenced in part because of the stigma associated with atypical age interests, especially those involving children, and therefore an unwillingness to admit to any such interests, especially if facing legal or other consequences. Most of what we know comes from studies of clinical or criminal justice samples who are very likely to differ in meaningful ways—greater histories of family abuse or neglect, juvenile delinquency, psychopathology—from the population of individuals with atypical sexual age preferences (see Seto, 2008, 2013). Moreover, because of the legal focus, most of what we know is about pedophilia, and to a notably lesser extent, hebephilia. Last, as already noted, most of the research has focused almost exclusively on men; we know very little about women, or about sexual age preferences in juveniles. Much more work is needed using anonymous surveys (which would be expected to be less biased because socially desirable responding is much less relevant), self-report measures, and recruitment of women and juveniles. I believe there is value in synthesizing this evidence, as a framework for future inquiry.

Multidimensional Sexual Orientation Space

My definition of sexual orientation can encompass other stimulus dimensions besides gender. We can also think about sexual orientation with regard to age and with regard to other dimensions in sexual stimuli (Seto, 2012). We can think of ourselves as “blobs” in a multidimensional sexual orientations space, with our individual blobs representing our idiosyncratic tendencies with regard to *gender*, *age*, *self-otherness*, *living–nonliving*, *species*, and *activities*. Though the focus of this review is sexual orientation with regard to age, age orientation needs to be understood in the context of other sexual dimensions. The idea of multiple sexual dimensions or configurations has also been noted by others, for example, van Anders (2015), though she notably did not address age variations or paraphilias more generally, except to mention them in her sexual configurations theory under the term, *sexual parameter n*.

Gender is the best known dimension of sexual orientation. Most individuals are only interested in opposite gender persons (i.e., they are exclusively heterosexual), with steeply decreasing numbers of individuals interested in same gender persons, from slightly to exclusively (Diamond, 2015; Savin-Williams, 2015). The gender dimension can be complex, as in the case of

individuals who are attracted to *gynandromorphs*, that is, target individuals with physical features of both sexes, such as breasts and penis (Hsu, Rosenthal, Miller, & Bailey, 2015), other individuals who are attracted specifically to transgender people (Money & Lamacz, 1984), and those who would describe themselves as more pansexual with regard to gender, for example, being attracted to both *cis*- and *trans*-gender women or men (see Table 1 for definitions of other technical terms used in this article).

Age is the second most studied target variation after gender. As this article will show, this statement is qualified because most sex research has assumed or focused on sexual interest in sexually mature adults, with the addition of a clinical and forensic literature focused on pedophilia (see Seto, 2008, 2009, 2013). As I discuss later, little is known about noncriminal variations in age interests, that is, for persons in different maturity categories above the legal age of consent.

The self-other (*auto-allo*) dimension reflects an emerging awareness that individuals' sexual interests can be directed outward toward others, or inward toward an imagined self. An example of variation in this dimension is autogynephilia, which Blanchard (2005) described as an erotic target location error wherein a man is sexually attracted to the idea of himself as a woman, as opposed to being attracted to women in the external environment. Lawrence (2009) extended the concept of

erotic target location errors to include paraphilias such as *apotemnophilia*, which refers to the paraphilia focusing on having one's healthy limb removed; this self-oriented paraphilia can be distinguished from its other-oriented form, which is a paraphilia involving sexual attraction to an amputee (*acrotomophilia*).

The living–nonliving (*bios–nekros*) dimension involves a distinction between living and nonliving targets of sexual interest. There are some interesting correspondences between an individual's preferred living and nonliving sexual targets, as demonstrated by the connection between body part fetishism (feet, hands, breasts, buttocks, penis) and object fetishism involving items associated with these same body parts (shoes, gloves, bras, lingerie, underwear). This superficial similarity may reflect something deeper about the structure of paraphilias, because the apparently lower prevalence of fetishism for other body parts (e.g., ears) is accompanied by a lower prevalence for corresponding clothing (e.g., earmuffs).

Another dimension involves a distinction between human and other species (*anthro–zoo*). A paraphilic interest in any nonhuman species falls broadly under the rubric of zoophilia, but can encompass single or multiple other species. Most of what we know about zoophilia involves domesticated mammalian species, such as dogs, horses, goats, or sheep (Williams & Weinberg, 2003). There is some evidence to support the idea that

Table 1 Age preference labels, derived from Greek roots

Age preferences	Focus	Tanner stage
Nepiophilia	Infants and toddlers to age 2	1
Pedophilia	Prepubescent children, approximately ages 3–10	1
Hebephilia	Pubescent children, approximately ages 11–14	2–3
Ephebophilia	Adolescent minors, approximately age 15–17	4
Teleiophilia	Young, sexually mature adults (ages 18 to late 30s)	5
Mesophilia	Middle-aged adults, peri-menopausal or peri-andropausal, from 40 to late 50s	5
Gerontophilia	Old adults, from age 60 plus	5
Paraphilias		
Gynandromorphophilia	Persons with both male and female-typical features	
Autogynephilia	Self as woman (for male respondent)	
Autopedophilia	Self as prepubescent child (for adult respondent)	
Zoophilia	Nonhuman species	
Apotemnophilia	Self with amputation	
Acrotomophilia	Other person with amputation	
Blastophilia	Nonconsent cues, e.g., saying no, resisting	
Fetishism	Body parts or nonliving objects	
Sadism	Domination, humiliating others, causing pain/suffering	
Masochism	Submission, being humiliated, experiencing pain/suffering	
Exhibitionism	Exposing one's genitals to unsuspecting stranger	
Voyeurism	Viewing unsuspecting stranger engaged in normally private activity, e.g., undressing	
Frotteurism	Pressing up against unsuspecting stranger	

Gynephilia refers to attraction to females. Androphilia refers to attraction to males. Mesophilia is a new term coined for this article, for a chronophilia focused on middle-aged persons. The word is derived from the Greek root *mesos*, meaning intermediate. Tanner stage refers to different stages of sexual maturation as described by Tanner (1990)

some individuals have a sexual orientation toward nonhumans (Earls & Lalumière, 2002, 2009; Miletski, 2001).

Sexual activities are likely to be distributed across multiple dimensions rather than one dimension, as there would be distinct dimensions for dominance–submission, sadism–masochism, and consent–nonconsent (biastophilia, discussed in detail by Lalumière, Harris, Quinsey, & Rice, 2005). For example, we have recently shown that self-identified sexually sadistic men recruited from the community showed relatively greater sexual arousal to sexual stimuli emphasizing violence and suffering, whereas adjudicated rapists responded relatively more to sexual stimuli emphasizing nonconsent (Harris, Lalumière, Seto, Rice, & Chaplin, 2012; Seto, Lalumière, Harris, & Chivers, 2012). Self-identified masochistic men often report interest in submission, but some also report interest in physical suffering; indeed, our analysis of sexual interests reported by self-identified masochists identified two different masochistic themes of suffering and submission (Chivers, Roy, Grimbos, Cantor, & Seto, 2014; Freund, Seto, & Kuban, 1995). Other better-known paraphilic dimensions pertaining to activity include exhibitionism (exposing one's genitals to an unsuspecting stranger), voyeurism (observing an unsuspecting stranger engaging in a private act such as undressing or bathing), and frotteurism (pressing up against an unsuspecting person).

Each of us is unique in our sexual orientations. In many cases, sexual orientation blobs are tightly bound around the species-typical nexus: For men, this would be attraction to sexually mature, live women and a preference for conventional sexual activities, particularly genital sexual intercourse. In other cases, however, the blob is larger and less regular, reflecting both typical and atypical variations in sexual interests across the dimensions. This variation can be quite complex because of interactions between dimensions. For example, Hsu and Bailey (2015) described individuals who reported autopedophilia, described as a sexual attraction to the idea of oneself as a child (see also Lawrence, 2009 regarding other autoparaphilias). Interestingly, this sample comprised self-identified pedophilic men, that is, individuals who were sexually attracted to prepubescent children in the external environment.

Asexuality could be conceptualized as an absence of sexual orientation, and thus situated at the mathematical origin of this multidimensional sexual orientations space, where all the axes are at zero. On the other hand, Yule, Brotto, and Gorzalka (2015) recently presented data suggesting asexual persons may not have a particular sexual preference for aspects of other persons, but they do vary in their sexual activity interests (e.g., bondage, humiliation play). Conceptually and empirically, asexuality has been discussed only with regard to gender, that is, attraction to others who are male or female. It would be interesting to know if asexuality encompasses other dimensions, for example, are self-identified asexual individuals similarly uninterested in the maturity status of other persons?

Chronophilias

I have previously discussed whether pedophilia could be viewed as a sexual orientation with regard to age (age orientation or *chronophilia* herein; Seto, 2012). In the previous special issue arising from the 2010 Puzzle of Sexual Orientation meeting, I focused on four features—age of onset; neurobiological correlates; association with romantic and sexual behavior; and stability over time—that are relevant, but not exhaustive, features of gender orientation. Other features that could be considered include preconscious attention (orienting); activation of reward pathways; recruitment of affective responses, including sexual response (Chivers, 2015); and genital arousal that can prepare for sexual intercourse (penile erection, vulvar vasocongestion/vaginal lubrication).

These features follow from a conceptualization of sexual orientations as essential aspects of one's sexuality that organize sexual attention, sexual response, and sexual behavior. Sexual orientations are at least partially innate, inasmuch as there is good evidence for gender orientation that it is partially heritable and associated with prenatal factors (see Mustanski, Chivers, & Bailey, 2002; Rahman, 2005), and similar evidence for an early emergence of pedophilic sexual interests (Alanko, Salo, Mokros, & Santtila, 2013; Cantor et al., 2008). Phenomenologically, gender orientation and pedophilia (and possibly other age orientations as well) begin to manifest with the sexual awakening associated with menarche/adrenarche and puberty (McClintock & Herdt, 1996). Sexual orientations also influence social behavior, as in dating and friendship formation, and for gender orientation, appear to be relatively stable over time, at least for males (see Diamond, 2003). It is not required that other sexual orientations parallel what we know about gender orientation, but the parsimonious hypothesis would be that they share similarities in features such as developmental trajectory, phenomenological experience, and behavioral expression (e.g., Calzo, Antonucci, Mays, & Cochran, 2011).

In this article, I extend my previous discussion from pedophilia to other chronophilias. There is a huge gap in the literature for sexual preferences for older adults because of a clinical and forensic bias toward studying chronophilias as a result of legal and social prohibitions against adult-child sex, including legal ages of consent for sex, sociocultural norms, and moral disgust reactions. There is not enough room in this article (or empirical literature) to provide a thorough, systematic review across the range of chronophilias. Instead, this is a selective discussion of different chronophilias designed to identify knowledge gaps, puzzles, and interesting directions for further research. The key argument in this section is that we have an incomplete understanding of how human sexuality is oriented if we focus only on gender as the important dimension; there are other dimensions to consider, and in this article, I argue age is important as well.

Species-Typical Age Preferences

Most humans are teleiophilic (sexually preferring young sexually mature adults) and heterosexual, but there are variations. Variation from teleiophilia can be in either direction, toward younger or older persons (see Fig. 1). The figure implies that prevalences of chronophilias decrease with distance from the species-typical teleiophilia (e.g., Earls & Lalumiere, 2002; Studer, Aylwin, Clelland, Reddon, & Frenzel, 2002). Recent analyses of the prevalence of same-sex sexual attraction indicate that prevalence goes down with distance from exclusive heterosexuality, with a general trend for those who are mostly heterosexual being more common than those who are bisexual, who in turn are more common than those who are predominantly or exclusively homosexual (e.g., Chandra, Mosher, & Copen, 2011; Savin-Williams & Vrangalova, 2013). The trend is clearer for women than for men, however, where there is more evidence of a bimodal distribution with a small peak of men identifying as exclusively homosexual, especially in older datasets, such as the pioneering work by Kinsey, Pomeroy, and Martin (1948).

It is not known whether the distribution of age interests is symmetrical, and it is theoretically plausible that atypical interests in younger persons is more common than in older persons among men, given the male-typical preference for youthfulness, irrespective of gender orientation (e.g., Kenrick & Keefe, 1992). Thus, men are expected to show a relatively higher frequency of chronophilias involving younger persons than for older persons. The relative frequencies of chronophilias among women are unknown; most women are teleiophilic, and there are only a few case examples of women who are pedophilic or hebephilic. Theoretically, we would expect a negatively rather than positively skewed distribution of age interests because women tend to prefer older sexual partners than themselves. As I discuss later, it is possible that age interests shift over the lifespan, as adolescent males may prefer peers or young adult women, and men show greater relative sexual interest in older women as they themselves age.

Sexual age preference is technically not for age but for sexual maturity stage, as reflected in body size and shape, secondary sexual characteristics, and other visible features (e.g., smooth vs. wrinkled skin, colored vs. gray/white hair). Surprisingly, most of the essential age cues are assumed rather than empirically demonstrated. Rapidly improving health and nutrition over the past century in industrialized nations means children enter puberty younger than they did in past years (Herman-Giddens et al., 1997; Herman-Giddens, Wang, & Koch, 2001). It also means that adults are older before they enter the mesophilic or gerontophilic range of appearance. Chronological and perceived age are not always congruent, even without the modern interventions of cosmetic surgery. For this reason, age ranges suggested in Table 1 as suggestive of maturity stage are lower than they would have been 100 or more years ago, and might continue to change based on health and lifespan changes in the future.

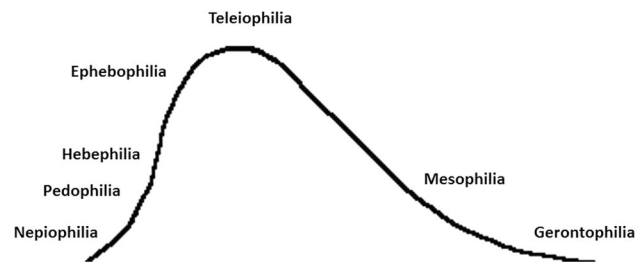


Fig. 1 Hypothetical relative frequency distribution of chronophilias among men. The relative frequency of chronophilias is unknown; existing evidence suggests most women are teleiophilic

Physical features have been emphasized in sexual arousal research on chronophilias (Seto, 2008), but preferences may also incorporate psychological features, for example, self-identified pedophilic men have reported innocence and playfulness as part of what they find attractive about children (Wilson & Cox, 1983). Much research on teleiophilic attraction suggests commonalities in what people find attractive about young men and women, including the importance of intelligence, kindness, and an agreeable sense of humor (Feingold, 1992; Li, Bailey, Kenrick, & Linsenmeier, 2002). Most of this research has involved undergraduate students or young adults recruited from the community; much less attention has been paid to the psychological and physical features that are attractive to older people, and the psychological characteristics that are attractive about older people. For example, I would expect that mesophilic and gerontophilic individuals would emphasize qualities such as wisdom, maturity, and experience as a part of what they find attractive about middle-aged and elderly persons, respectively.

The Tanner (1990) stages describe physical development from childhood to adulthood, based on visible primary and secondary sexual characteristics such as the appearance of the genitals, size of breasts or testes, and development of pubic hair (see Figs. 2 and 3). Nepiophilia and pedophilia correspond to Tanner Stage 1; hebephilia corresponds to Tanner Stages 2 and 3; ephebophilia corresponds to Tanner Stage 4; and teleiophilia, mesophilia, and gerontophilia correspond to Tanner Stage 5 (though one could argue there is a need for additional Tanner stages to represent the appearance of middle-aged and elderly persons). The current Tanner stages do not reflect the lifespan, as there continue to be changes in the appearance of the genitals and overall physical appearance progressing from young sexually mature adults to elderly adults.

Natural selection is expected to drive toward a preference for opposite-sex, sexually mature persons, because individuals who do not have this preference are expected to be less likely to reproduce and thus are less likely to pass on their preference for partners who are not opposite-sex and sexually mature.³ Indeed, Hames and

³ Darwinian selection would be less powerful for women, as they could successfully reproduce with any male capable of producing viable sperm, from adolescent to elderly man, though the quality of sperm deteriorates with age. This does not mean women are indifferent to age, however, as age

Blanchard (2012) reviewed available anthropological data and suggested that a preference for pubescent children is not adaptive (see also Blanchard, 2010b). In addition, Clancy (2012) pointed out that girls just past menarche are subfecund because more of their menstrual cycles do not include ovulation. Clancy cited Ellison, Panter-Brick, Lipson, and O'Rourke (1993) to suggest the most consistent menstrual cycles are found in women age 25–35, which also contradicts the notion that the youngest adult women are the most fertile (though both teenaged girls and young adult women would be high in reproductive value, i.e., potential reproductive capacity: Symons, 1979).

Clancy (2012) also made the important point that anthropological evidence that men have married pubescent girls in the past or in some contemporary hunter-gatherer societies does not mean they have a sexual preference for this maturity stage. Marriages can take place to secure dowries, strengthen family connections, secure a virgin bride, increase paternity certainty, for later sex and production of children. Having an ability to be sexually responsive to pubescent girls (or to postmenopausal women) is not evidence of paraphilia. In my view, the key test would involve choice: Given a choice between a prepubescent or pubescent girl (or elderly woman) and a young sexually mature woman, most gynephilic (female-attracted) men would prefer the young sexually mature woman. Among men, a heritable *preference* for prepubescent or pubescent girls or for postmenopausal women would be selected against, unless there was a countervailing selection pressure to retain traits underlying this preference. It is worth emphasizing that reproduction is not a conscious motivation for sex or for sexual partners; proximal mechanisms involve feelings of attraction, desire, love, attachment, and pleasure; ultimately, however, feelings of attraction that reduced reproduction would be less represented in subsequent generations (see Buss, 2014).

Evolutionary theories about human mating strategies distinguish between reproductive value and fertility (Buss, 1989). Reproductive value refers to the potential number of offspring that could be produced over time, and thus focusing on reproductive value represents a longer-term strategy, as in the case of marriage to pubescent or even prepubescent girls. Kramer (2008) presented another example from a hunter-gatherer society: Pume girls experience menarche on average at age 12.9, and give birth to their first child at mean age 15.3–15.5 (from retrospective and cross-sectional data); girls who had children before the age of 14 experienced higher infant or personal mortality. Clancy (2012) cited a number of other studies showing that early pregnancy is associated with a higher risk of negative outcomes. Fertility, on the other hand, means maximizing the chances of reproduction,

and thus would represent a shorter-term strategy focusing on young adult women (e.g., in their early to mid-20s). This is reflected in male-typical age preferences for casual sex partners, pornography actors, and models (Kenrick & Keefe, 1992; Ogas & Gaddam, 2011; Rudder, 2014).

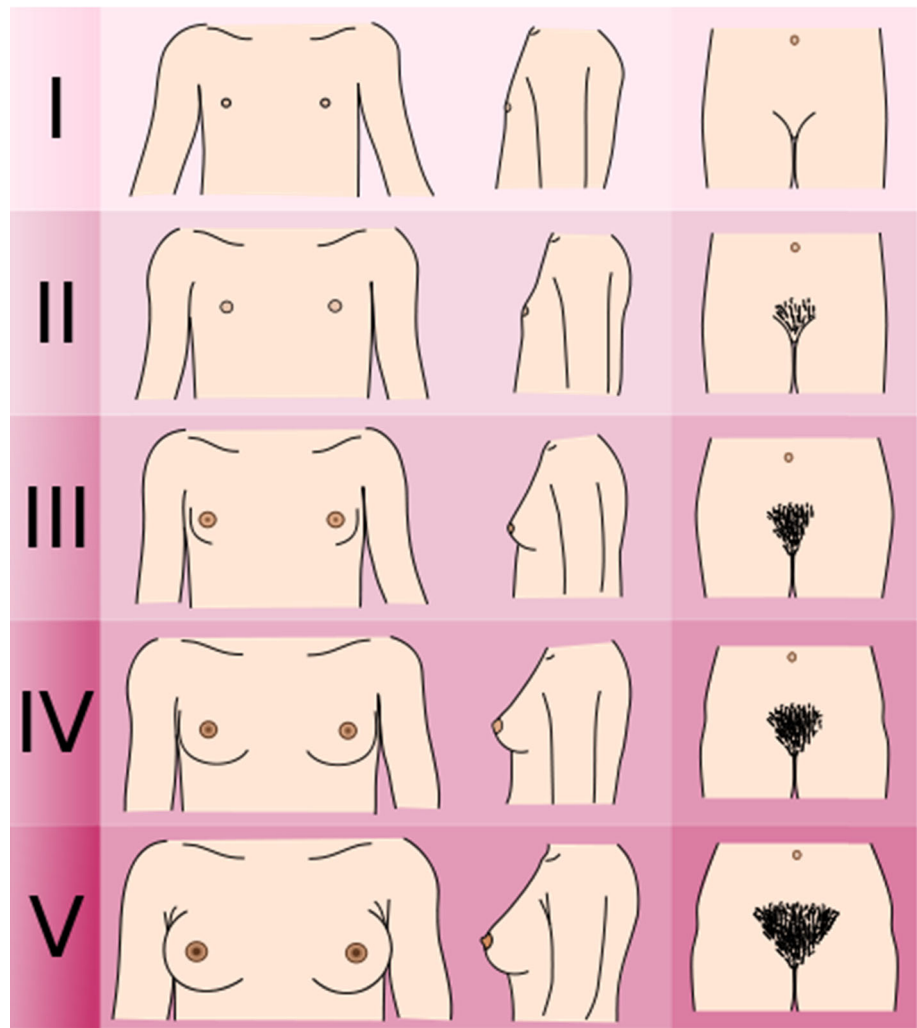
Though preferences for other than sexually mature, fertile partners would probably be suboptimal, variations from heterosexual teleiophilia might be maintained in the human population—at a low frequency—as a result of opposing selection pressures (e.g., frequency-dependent selection) or as a byproduct of other adaptations. The literature has largely focused on testing selectionist or byproduct hypotheses regarding homosexuality, such as the avuncular hypothesis, maternal immune response hypothesis, or sexually antagonistic gene hypothesis (e.g., Blanchard, 1997; Vasey & VanderLaan, 2012). Seto (2008) suggested that a sexual attraction to pre-adults in men might reflect a malfunction of the male-typical preference for youthfulness, such that a sexual preference for prepubescent or pubescent children is the byproduct of men being attentive and responsive to facial neoteny, smooth skin, lustrous hair, playfulness, exuberance, and other physical and behavioral cues of youthfulness. This idea has not been strongly tested empirically, however, and it does not explain the existence of sexual preferences for middle-aged or elderly persons.

There is an important distinction between sexual preferences, whether exclusive or nonexclusive, and opportunistic sexual behavior or idiosyncratic sexual attractions. The focus here is on persistent, recurrent, intense attractions for persons of differing maturity stages, not idiosyncratic attractions, as when a teleiophilic man falls in love with an elderly woman (or a young adolescent girl) but usually prefers young adult women. Many people grow older and happily continue to experience love, attachment, and pleasure with their aging partners. This is not evidence of a sexual preference, either, but might instead reflect the influence of learning. Again, the choice test would be, is the person more sexually attracted to their loved partner at their older age or the same person when they were younger?

Most sex research has assumed teleiophilia. Any general recruitment for sex research is going to produce samples that mostly comprise teleiophilic individuals, because other sexual age orientations are relatively rare, whether the focus is on the general population or self-identified groups based on gender orientation (e.g., studies of gay men or lesbian women would still mostly comprise teleiophilic participants). Though some nonteleiophilic participants may be recruited, they are invisible to the researcher if questions about age interests are not asked and they may be likely to hide their nonteleiophilia even if asked, unless sufficient privacy protections are in place. It is impossible to summarize the entire sex research literature, but it is clear from a statistical and Darwinian perspective that chronophilias are rare. My current best estimate of the prevalence of pedophilia in men is 1 %, with a slightly higher number for hebephilia: Seto, 2008, 2013; see also <http://www.bbc.com/news/magazine-28526106>.)

Footnote 3 continued
is correlated with traits that are of significance, such as social status, access to resources, and physical strength.

Fig. 2 Tanner stages for female breast and pubic region. Illustrations by Michał Komorniczak, available by Creative Commons 3.0. Attribution-ShareAlike (CC BY-SA 3.0) from Wikipedia page: https://en.wikipedia.org/wiki/Tanner_scale



Wakefield (1992, 2012) has suggested that a condition is a disorder if it causes harm to the person and represents a dysfunction, that is, evidence that a biological mechanism is not functioning in the way that it was naturally designed. Thus, someone who is teleiophilic but also capable of substantial sexual interest in adolescent (ephebophilic?) or middle-aged persons (mesophilic?) and who is not harmed by these other sexual age interests is unlikely to meet these criteria. Someone who is predominantly or exclusively nonteleiophilic, however, might meet these criteria because their age interest would harm their reproductive success and could result in social impairment or serious subjective distress.

Nepiophilia

Very little is known about nepiophilia (sexual interest in infants and toddlers; see Table 1) beyond descriptions of a few adult male sex offenders. Nepiophilia (and gerontophilia) are expected to be the rarest chronophilias because they are the biggest

deviations from the teleiophilia norm. Greenberg, Bradford, and Curry (1995) conducted a small descriptive study comparing 10 nepiophilic sex offenders and 28 pedophilic sex offenders. The nepiophilic offenders were called infantophiles in the article, even though this group included anyone with victims younger than 5 and who admitted sexual interest in this age group; the average victim age for the nepiophilic offender group was 3.9 years old. There were almost no differences between nepiophilic and pedophilic offenders in this under-powered group comparison.

An analysis of American sexual victimization data from the National Incident-Based Reporting System (NIBRS) maintained by the Federal Bureau of Investigation shows that very young child victims are rare (Snyder, 2000; see Fig. 4). An analysis of 2004 NIBRS data by Finkelhor, Ormrod, and Chaffin (2009; see Fig. 5) shows sexual offenses against children under the age of 2 are rare compared to sexual offenses against prepubescent or pubescent children. This may partially reflect opportunity, however, rather than entirely the prevalence of nepiophilia. Exclusively nepiophilic individuals would be unlikely to have children of their own, given that would require reproductive sex with a fer-

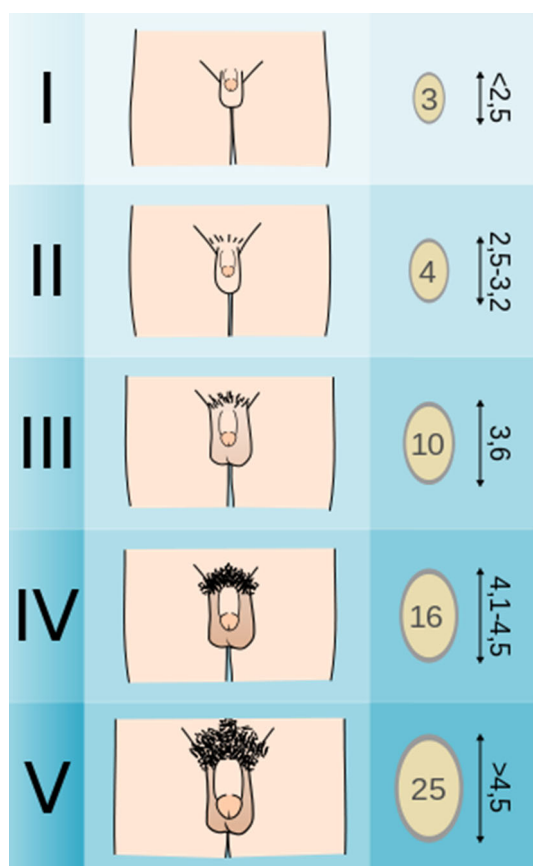


Fig. 3 Tanner stages for male genital appearance. Illustrations by Michal Komorniczak, available by Creative Commons 3.0. Attribution-ShareAlike (CC BY-SA 3.0) from Wikipedia page: https://en.wikipedia.org/wiki/Tanner_scale

tile adult, and nonrelatives would have much less access to such young children, whereas older children interact more with unrelated adults through school, sports, and other activities.

Sexual interest in infants or toddlers is rare as reflected by child pornography content. Quayle and Jones (2011) found that 1–2 % of the more than 24,000 child pornography images in their analysis of a large police database depicted very young children appearing to be babies or toddlers, compared to half of the girl images and 73 % of the boy images depicting prepubescent children. The most commonly depicted age category depicted in child pornography is prepubescent children, followed by pubescent children, and then infants/toddlers (Quayle & Jones, 2011; Wolak, Finkelhor, & Mitchell, 2011). Only 1 % of our sample of 286 child pornography offenders had images of such young children, compared to a third with images of prepubescent children and 20 % with images of pubescent children (Seto & Eke, 2015).

Pedophilia

Pedophilia (sexual interest in prepubescent children; Tanner Stage 1) is currently the best known chronophilia and was the focus of Seto (2012). In that article, I more narrowly discussed

the controversial idea of conceiving pedophilia as akin to a sexual orientation, but for a particular age/maturity group rather than for gender. Interested readers are directed to more detailed reviews about pedophilia in Seto (2008, 2009, 2012, 2013). I highlight only a few key points here because they are relevant to thinking about other chronophiliias discussed in this review: Prevalence (as an anchor for what prevalences might be like for other chronophiliias), gender differences, and etiology.

Prevalence

I suggested in Seto (2008) that an upper-limit prevalence estimate of pedophilia in the general male population was 5 %, based on inferences from convenience surveys that typically asked questions about sexual fantasies, thoughts, or behavior involving children without the concurrent questions about intensity of interest, frequency of fantasies etcetera, or persistence, all of which are relevant to ascertaining pedophilia. This was a liberal upper limit, with the expectation that the actual prevalence was lower. In Seto (2013), I revised the upper-limit estimate to 3 %, based on data published since the 2008 book. Most recently, I have suggested a 1 % prevalence rate based on new, large Finnish and German surveys (Santtila et al., 2015; see <http://www.bbc.com/news/magazine-28526106>). If my hypothesis about the distribution of chronophiliias is correct, nepiophilia is even rarer and hebephilia is more common than pedophilia (for hebephilia, see Blanchard et al., 2009; Studer et al., 2002).

Gender Difference

Pedophilia is much more common in men than women, which is true of most paraphiliias, with the exception of masochism (Chivers, Dawson, Curry, Bradford, & Seto, 2015) and possibly objectum sexuals (a.k.a. objectophilia) and feederism

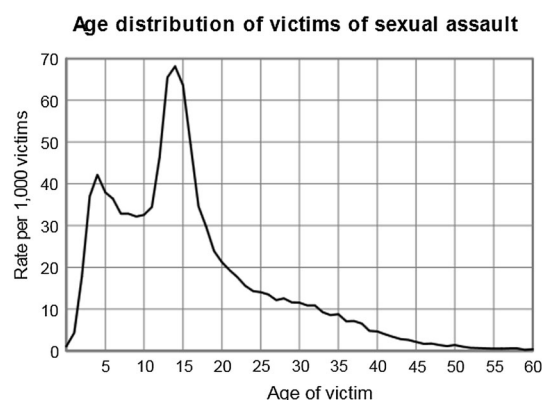


Fig. 4 Taken from Fig. 1 in Snyder (2000), illustrating frequency of victims by age per 1000 victims. Note: There are two peaks in victim age, the first corresponding to sexual offenses involving prepubescent children, with a peak near 5, and the second involving adolescent victims, with a peak near 14

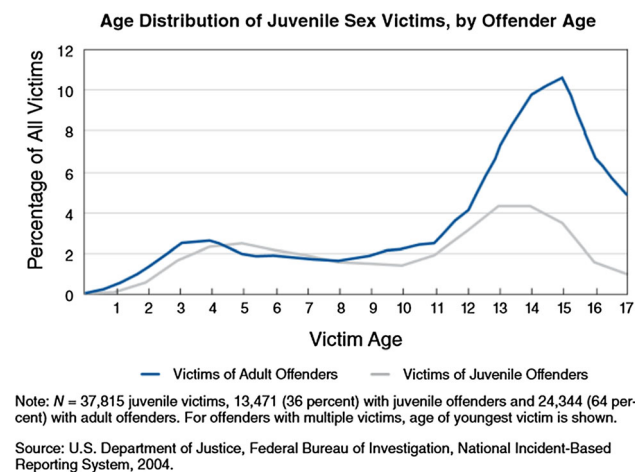


Fig. 5 Taken from Finkelhor et al. (2009), summarizing data on the age distribution of juvenile sex victims using federal data from the United States

(Marsh, 2010; Terry & Vasey, 2011). Dawson, Bannerman, and Lalumière (2014) found evidence from a different online survey that this broad gender difference in paraphilias may mostly be accounted for by a large and robust gender difference in sex drive. Indeed, returning our focus to chronophilias, only case studies of pedophilic women are available (e.g., Chow & Choy, 2002). The only study to use a genital measure of sexual attraction found that a female sex offender with child victims showed nonspecific genital responses to child and adult stimuli (Cooper, Swaminath, Baxter, & Poulin, 1990). In contrast, a recent study of teleiophilic men and women showed that both groups showed a difference in visual reaction time to swimsuit depictions of prepubescent children compared to adolescents or adults, though women continued to show a pattern of non-specific responding with regard to gender (Chivers, 2015; Imhoff et al., 2010, see Fig. 2). The results of Imhoff et al. suggest again that gender and age interests operate independently, and also suggest that measures of “earlier” attention and evaluation processes (measured in milliseconds) can reveal differential responding to age/maturity categories that “later” genital responding (measured in seconds) does not.

Any useful theory about chronophilias must take these large and robust gender differences into account. Any theory of male chronophilias must also incorporate the male-typical preference for young adult women, shifting from slightly older or same-aged targets for adolescent males to progressively younger women as men grow older. Kenrick and Keefe (1992) reviewed multiple studies supporting this gender difference in age preferences, including analysis of American and German dating advertisements, marriage ages in 1923 Phoenix, Seattle in the 1980s, a small Philippines island, and marriage ads in India. The gender difference in age preferences has been replicated across cultures (e.g., Buss, 1989; Ogas & Gaddam, 2011).

In clinical and forensic settings, most child pornography offenders and most contact sexual offenders with child

victims are male adolescents or men (e.g., Seto, Cantor, & Blanchard, 2006). The large majority of pedophilia research has been conducted on male participants, with only a few female case studies reported so far. For reasons not yet fully understood, pedophilia is clearly much more common in men than in women. By implication, nepiophilia and hebephilia are also expected to be more common among men than women. We do not know how chronophilias might operate in women: We cannot assume that what we know about male age preferences translate to female age interests, just as recent work on gender orientation shows we cannot assume findings from nonheterosexual men translate to nonheterosexual women (Chivers, 2015; Kenrick, Keefe, Bryan, Barr, & Brown, 1995).

Etiology

There are multiple lines of research converging on the hypothesis that men have an early vulnerability toward the development or expression of pedophilia. This includes research on the greater prevalence of objectively assessed developmental perturbations such as nonright-handedness (a prenatally influenced shift from the species-typical right-handedness, and associated with various developmental perturbations), differences in height, lower intelligence, white matter differences, early head injury, and minor physical anomalies such as low-set ears (Blanchard et al., 2003; Cantor et al., 2004, 2008; Dysznuik, Murray, Fazio, Lykins, & Cantor, 2015; Fazio, Lykins, & Cantor, 2014).

These differences between pedophilic sex offenders and other men do not preclude postnatal environmental explanations for pedophilia. For example, white matter differences could reflect plasticity as a result of early experiences rather than a preexisting difference leading to pedophilia. However, a recent study demonstrating differences in minor physical anomalies, which manifest prenatally, as does nonright-handedness, further supports the notion that some individuals may be born with a predisposition toward pedophilia (Dysznuik et al., 2015).

Using data from a Finnish twin cohort, Alanko et al. (2013) found evidence of 15 % heritability for sexual interest in minors under the age of 16, which would include nepiophilia and hebephilia as well as pedophilia. This indicates that some of the variance in sexual interest in minors is accounted for by genetic variance. This heritability estimate, however, is lower than for traits such as intelligence and personality, and also lower than found for gender orientation (Bailey, Dunne, & Martin, 2000; Kendler, Thornton, Gilman, & Kessler, 2000). Taken together, the evidence suggests a multifactorial explanation for pedophilia, with different paths to pedophilia, just as there are different paths to nonheterosexuality as a result of the fraternal birth order effect and other environmental inputs. In other words, the manifestation of sexual interest in prepubescent children could be the end-stage of different etiological pathways, which might suggest there are different types of pedophilia.

Hebephilia

Hebephilia (sexual interest in pubescent children; Tanner Stages 2 and 3) is sometimes confused with pedophilia, which is specific to prepubescent children (Tanner Stage 1) or an interest in ephebophilia (Tanner Stage 4). Hebephilia is sometimes inaccurately described as a sexual preference for adolescents (versus children), which would encompass both young adolescents who are peripubescent or early pubescent (fitting with hebephilia) and older adolescents who are sexually maturing or appear sexually mature (not fitting). A sexual interest in sexually mature adolescents, though socially sanctioned in modern Western societies if under the legal age of consent, is neither uncommon nor atypical.

Research by Stephens (2015) suggests that men with hebephilia are more likely to be nonexclusive in their age interests than either men with pedophilia or teleiophilia (see also Beier et al., 2009). The most parsimonious explanation is that clinical and forensic studies of pedophilia and hebephilia have often relied on victim age data, which are an imperfect proxy for maturation stage. Many young people who are between the ages of 11 and 14 (a relatively narrow age range) will indeed be pubescent in appearance (Herman-Giddens et al., 1997, 2001); however, hebephilic men might offend against younger children or older adolescents who look pubescent, and thus seem to be less exclusive when categorized based on victim age, but they are not less exclusive if they were categorized on victim maturity stage. More precise knowledge about all chronophilias would be gained if data were available on Tanner stage of development and classifications were based on maturity stage rather than chronological age alone.

Hebephilia is increasingly the subject of research on chronophilias given its clinical and forensic significance and the controversy regarding its potential inclusion in DSM-5, summarized by Blanchard in previous *Archives* issues (Blanchard, 2009, 2010a, b). The debate focused more on whether hebephilia was a mental disorder or could be misused in legal proceedings, rather than whether hebephilia existed as a distinct chronophilia. Hebephilia was not accepted in DSM-5 as a specifically named paraphilia, but it can still be diagnosed as an Otherwise Specified Paraphilic Disorder (American Psychiatric Association, 2013).

Rind and Yuill (2012) argued that the criminalization and pathologization of hebephilia reflected a contemporary preoccupation, claiming: “[h]istorically and cross-culturally, puberty, rather than completed sexual maturity, has generally been the criterion for nubility (i.e., when females are considered marriageable and ready for copulation).” They cited marriage age data and noted a trend for young men to marry young adolescent girls, where those girls were even less likely to show secondary sexual development than in the modern era. Rind and Yuill suggested this implied a capacity for response to pubescent and post-pubescent persons might be innate for typical men, but do not discuss the idea that these marriages might have occurred for

reasons other than sexual preference, including gaining a dowry, strengthening family connections, or seeking a virgin for later sex and reproduction (Clancy, 2012). Rind and Yuill recognized the distinction between potential reproductive value and maximum fertility in their theoretical argument, where someone who is peripubertal or just postpubertal is not necessarily the most desired mate, but is a good candidate for long-term marriage, with the intention of having offspring later. They did not, however, distinguish between sexual interest or attraction—where someone can have some sexual response to a particular age/maturity category—and sexual preference, wherein someone prefers a nonadult person if given the choice.

Ephebophilia

Ephebophilia refers to a sexual interest in postpubescent adolescents who are not fully sexually mature yet but who also are clearly not pubescent (Tanner Stage 4). Though ephebophilia is sometimes used to refer only to those attracted to adolescent boys, for example, those typically between the ages of 15 and 17, in this article, I use this term to refer to chronophilias involving male or female targets. Ephebophilia is subject to a great deal of confusion because of its conflation with legal standards and moral norms. For example, the fact that the age of consent is 16 in Canada and in many American states, and that there is clearly some interest in regarding this age range—as demonstrated by “barely legal” or “schoolgirl” pornography genres, popular cultural memes regarding “jailbait,” the use of young teen models in mainstream fashion and other media—does not directly speak to the existence of ephebophilia. Because of the blurriness of sexual maturation from adolescence into adulthood, teleiophilic men and women might well have some sexual attraction to 15–17 year olds, even if it is illegal and/or socially frowned upon. Moreover, some young adults look like minors (and some minors look like adults).

Self-report and criminal justice data suggest the highest relative risk of sexual victimization is experienced by post-pubescent adolescents, consistent with the idea that most of the general population are teleiophilic, with some perpetrators offending opportunistically against sexually mature looking adolescents below the legal age of consent and some unknown proportion of others having ephebophilia (Finkelhor et al., 2009; Snyder, 2000).

Because of an absence of studies focusing on sexual interests, this section relies on a review of studies of relevant behavior, including studies of clergy sex offenders, statutory sex offenders, and online solicitation offenders who use Internet technologies to sexually approach minors. The shared feature across these study groups is sexual involvement with adolescents. I am particularly interested in cases involving multiple adolescent victims, as that is more suggestive of ephebophilia rather than opportunistic behavior involving a single victim (Blanchard, 2010a; Seto, Stephens, Lalumière, & Cantor, 2015). I start with a discussion of

a large-scale study of clergy sex offenders in the United States because the group was not simply defined on the basis of sexual behavior; instead, an attempt was made to identify those who were more likely to be ephebophilic on the basis of having multiple victims in the target age category.

Clergy Sex Offenders

The largest dataset on clergy sex offenders that I am aware of comes from a 2004 John Jay College of Criminal Justice study of 1548 cases with sufficient information about victim ages (again, a proxy for maturity stage) (Tallon & Terry, 2008). Of these 1548 cases, 693 cases were deemed to involve specialist offenders because they had two or more victims in the same age and/or gender category, whereas offenders with only one victim in the same age or gender category would be more likely to be opportunistic; of these 693 cases, 474 were deemed to be ephebophilic because they had two or more male victims between the age 13 and 17, compared to 96 pedophilic offenders with two or more victims age 10 or younger. Although the majority of victims were male adolescents, most clergy offenders had victims in other age categories as well (see Guay, Proulx, Cusson, & Ouimet, 2001; Stephens, 2015). Only 11 % of the clergy sex offender sample met the definition of an ephebophilic offender (see also Cartor, Cimbalic, & Tallon, 2008).

Statutory Sex Offenders

Troup-Leasure and Snyder's (2005) analysis of American crime data found that 1 in 4 rapes are statutory in nature. Under American law, statutory rape refers to nonforced sex between an adult and an underage minor who is therefore not legally able to give consent (hence the designation of this crime as rape). Unlike the clergy offenders, most victims of statutory sex crimes are female and most perpetrators are male (see also Moore, Liechty, Ikramullah, & Cottingham, 2005). The majority of victims are of ages 14 or 15, and thus these offenses are very unlikely to reflect pedophilia and relatively unlikely to include hebephilia. Only some of these offenses might reflect ephebophilia, as opposed to opportunistic involvement with underage girls by teleiophilic men. The median age difference was 6 years for male perpetrators with female victims, so this category of sexual offense mostly involves young adult men and high school-aged girls.

Online Solicitation Offenders

Online solicitation offenders are individuals who use internet technologies to sexually solicit minors, which can include suggestions to meet in person, when sexual activity might take place, or sexual chats and exchanges of sexual images online (see Seto, 2013). The National Juvenile Online Victimization study of cases reported to police found that 75 % of solicitation

victims were girls, 75 % were between the ages of 13 and 15, and the most common victim age was 15 (27 % of cases) (Wolak, Finkelhor, Mitchell, & Ybarra, 2008). In a majority of cases, the adult and minor already knew each other offline, and internet technologies were used to communicate with each other without the knowledge of the minor's parents or guardians. In a real sense, many solicitation cases involving real minors (rather than undercover police officers posing as minors) represent an online manifestation of statutory sexual offending. Wolak et al. estimated online cases represent a small proportion (7 %) of total statutory sex crimes.

Teleiophilia

There is too much literature on teleiophilia (sexual interest in sexually mature adults, Tanner Stage 5) to review here, given it is the main participant population for almost all sexuality research. In this section, I highlight a few key findings. First, there is a robust gender difference in age preferences as expressed in terms of sexual attraction and behavior. Kenrick and Keefe (1992) noted that, following logically from Parental Investment Theory (Trivers, 1972), men prefer younger women and actually marry or commit to women who are slightly younger, on average. This male preference for younger women becomes more pronounced with age. In contrast, women prefer similarly aged or slightly older men. This suggests that younger sexual age interests should be more common in men than in women, whereas older sexual age interests should be more common in women.

Kenrick et al. (1995) reported evidence of an interaction between gender and age orientations, because the male-typical preference for younger partners was found for both gynephilic and androphilic (male-attracted) men, whereas gynephilic women showed an age preference that was intermediate between those shown by androphilic women and gynephilic men. Men who have sexual contacts with boys are more likely to be pedophilic than men who have sexual contacts with girls (e.g., Seto & Lalumière, 2001; Seto et al., 2015).

Second, I briefly review features that are consistently attractive to gynephilic men because they may suggest critical age-related cues that are important for nonteleiophilic men; I return to these potentially important age cues later. The focus here again is on male preferences. Psychological characteristics such as intelligence, kindness, sense of humor appear to be cross-cultural and cross-temporal, and show smaller gender differences.

- (1) Facial attractiveness, includes feminized shape, symmetry, and neotenous features such as big eyes.
- (2) Body attractiveness, includes firm and full breasts, waist-hip ratio, overall size.
- (3) Smooth and unblemished skin, lustrous hair, healthy appearance.

Suggestions for the key features across age/maturity categories are presented in Table 2. We can compare these features to

those reported by Wilson and Cox (1983) for a small group of 77 self-identified pedophilic respondents. The personality characteristics that were identified included openness/curiosity, vitality, honesty, and warmth. Tellingly, the top characteristic was “innocence,” endorsed by 17 of 77 respondents. Physically, the number one characteristic was vague, good looks (12 of 77), the next was smooth skin/hairlessness (11 of 77). The low endorsement rates across these features suggest there may be other features that are more consistently rated as important, or that pedophilic men are idiosyncratic in what they find attractive about prepubescent children. Surprisingly, little work has been done on what aspects of children are most attractive to pedophilic or hebephilic men; larger-scale surveys are sorely needed.

Body shape and size were considered to be particularly important age cues by Kurt Freund, a pioneer in research on pedophilia and hebephilia (e.g., Freund, Watson, Dickey, & Rienzo, 1991; see also Quinsey & Lalumière, 1995). There are obvious, large differences in body size from infancy to adulthood. For body shape, research on gynephilic and teleiophilic participants suggests waist-to-hip ratio (WHR) is a particularly relevant cue for both age and gender. WHR is distributed bimodally, with little overlap according to Singh (1993): The average WHR in premenopausal women ranges from .67 to .80, whereas the average WHR in men is .85 to .95. WHR is associated with fertility and health in women, decreasing in a female-typical direction with puberty and the addition of fat to the hips, and then increasing in a male-typical direction postmenopausally (Lanska, Lanska, Hartz, & Rimm, 1984; Zaadstra et al., 1993). Singh (1993) and others have presented cross-cultural evidence suggesting men prefer a WHR close to .70, and there have been efforts to show that this preference has existed across time as well.⁴ WHR has a bigger impact on attractiveness ratings than body mass index or weight (and is correlated positively with both). WHR is close to one for both boys and girls before puberty. Other recent research suggests other aspects of body shape can be important as well, such as extent of lumbar curvature (Lewis, Russell, Al-Shawaf, & Buss, 2015).

The development of secondary sexual characteristics is important for both gender and age interests, including changes in the appearance of genitals, the emergence of breasts in girls, and the appearance of body hair. Another feature that is likely to be important is facial neoteny. Jones et al. (1995) explained that a youthful, or neotenous, face is one that combines a high ratio of neurocranial to lower face features with a small nose, small ears, and full lips. Multiple studies have shown that the facial attractiveness of women is correlated with neoteny, whereas the impact of neoteny on male facial attractiveness is more mixed. Indeed, the neotenous features of female models are an extreme example of the potency of these cues. Jones et al. applied their algo-

rithms and concluded that female models have extremely neotenous faces, with predicted ages based on facial proportions of approximately 7 years (!). This is not to suggest that female models' faces match those of actual 7-year-olds, but instead that these faces represent supranormal signals of youth compared to other women, including other young and attractive women.

The face has important influences on ratings of physical and sexual attractiveness.⁵ Indeed, Ponseti et al. (2015) showed that 24 pedophilic and 32 nonpedophilic men could be distinguished by their fMRI activity to child versus adult faces, based on two indices (girl vs. woman and boy vs. man). Classification accuracy was good, with 95 % sensitivity and 91 % specificity. In other words, there was no need to show body features as well as facial features to distinguish the two groups of men. Post hoc analyses showed activations to face stimuli produced better classification than activations to stimuli depicting bodies or genitals, perhaps because faces are stronger cues of age.

Jones et al. (1995) make the valuable point that there are different cues—perhaps reflecting processing by different psychological modules? (see Quinsey & Lalumière, 1995)—for youthfulness and that they can combine or interact. The most attractive women to gynephilic men are not neotenous across all physical features: Most men are not most sexually attracted to the bodies of children or young adolescents. Instead, they are strongly attracted to women with highly neotenous faces (resembling a young child), smooth skin, lustrous hair, and sexually mature bodies with firm, full breasts, and a WHR close to .70, a combination that signifies the target person is postpubertal and premenopausal.

Mesophilia and Gerontophilia

The biggest gaps in our knowledge about chronophilias are for mesophilia and gerontophilia, probably because there are no legal repercussions unless nonconsent is involved, and thus there has been very little clinical or forensic attention to these age interests. There is not even a word for someone who is sexually attracted to middle-aged persons so I coined the term *mesophilia* after consulting with Blanchard (who coined the term teleiophilia: personal communication, September 24, 2015).

The existence and relative prevalence of mesophilia is hinted at by the relative popularity of the MILF (for “Moms I’d Like to Fuck”) genre in pornography (e.g., Pornhub Insights, 2015; Ogas & Gaddam, 2011); there is also DILF⁶ pornography. It is worth pointing out that the actors identified as MILFs or DILFs are

⁴ Although preferred WHR varies across populations, men seem to always prefer women with a WHR lower than their own (e.g., Bovet & Raymond, 2015).

⁵ Some have argued that facial neoteny is not a male universal, instead reflecting the impact of novel environments (e.g., Scott et al., 2014). Also, other facial features matter too, particularly symmetry, averageness, and femininity. Though correlated with each other, each facial parameter is distinct; for example, the extreme neoteny of female models, for example, is not consistent with averageness, by definition.

⁶ You can figure out the acronym for yourself.

Table 2 Hypothetical features of greatest interest to gynephilic males, across age/maturity categories

Characteristic	Nepiophilia	Pedophilia	Hebephilia	Ephebophilia	Teleiophilia	Mesophilia	Gerontophilia
Life experience	Innocence	Innocence	Curiosity/awakening	Experimentation	Learning	Mature	Wisdom
Secondary sex characteristics	None	None	Emerging	Maturing	Mature	Mature	Mature
Body size	Tiny	Small	Growing	Growing	Adult	Adult	Adult
Neotenus face	High	High	High	High	High	Low	Low
Waist-hip ratio	Close to 1	Close to 1	Decreasing from 1	Close to .70	Close to .70	Closer to 1	Closer to 1
Firm, smooth skin	Yes	Yes	Yes	Yes	Yes	“lines”	Wrinkles, age spots
Hair	Lustrous	Lustrous	Lustrous	Lustrous	Lustrous	Graying	Gray, white

There may well be other features; this is a hypothetical list to stimulate ideas for future research. Features that are likely to be universal or do not demarcate age/maturity categories are not listed, e.g., intelligence and facial symmetry are likely to be attractive across age/maturity categories

often in their 30s rather than their 40s, 50s, or 60s. Depictions of actually middle-aged persons are more likely to be characterized as “granny” (or grampa) pornography, though sometimes the individuals are in fact seniors. I am not aware of any empirical research on individuals attracted to middle-aged persons.

Unlike the study of ephebophilia, hebephilia, pedophilia, or nepiophilia, there are no legal restrictions on depictions of solo or consensual sexual activity of adults, of whatever age, though there might be stigma associated with an interest in elderly persons. Analyses of mainstream pornography searches and pornography content, therefore, could shed much needed light on mesophilia and gerontophilia. Age-related searches examined by Ogas and Gaddam (2011) suggest there is indeed an asymmetric and age-related gradient as suggested in Fig. 1. For example, in their analysis of Dogpile search engine queries, “teen” represented 5.8 % of all searches, compared to 1.4 % for “mom” or 1.3 % for “MILF,” and 0.5 % for “grannies.” Other search terms were also rare, e.g., “mature” or “cougar” (alternate terms for the same kinds of MILF or granny-themed pornography).

Joyal, Cossette, and Lapierre’s (2015) online survey regarding potentially paraphilic sexual fantasies found that 34 % of women and 48 % of men endorsed the item, “I have fantasized about having sex with someone much older than me” (p. 7). Unfortunately, the item did not specify ages or age ranges, and someone in their 30s or 40s could be considered much older by a young adult respondent. These prevalences, though, can be contrasted with Joyal et al.’s age-specific item relevant to pedophilia: 0.8 % of women and 1.8 % of men endorsed the item, “I have fantasized about having sex with a child under the age of 12 years.”

The few gerontophilia case studies in the literature are all confounded with sexual offending, because they involved the rape or sexual assault of elderly victims (see Ball, 2005). Whether the offenders were truly gerontophilic is unknown; it might be the case that sexual assault of an elderly victim is seen as so unusual by clinical evaluators that a paraphilic motivation is assumed rather than demonstrated (Ball, Snowden, & Strickland, 1992; Kaul & Duffy, 1991). A rare example of potential gerontophilia in popular culture is the cult classic film, *Harold and*

Maude, which does not involve coercion or violence but does suggest psychopathological motivations for “Harold,” a depressed, death-obsessed 20-year-old man who attends funerals, where he meets “Maude,” a fun and eccentric 79-year-old woman he falls in love with. Another rare example comes in a television segment about a 31-year-old man who prefers dating elderly women (<http://www.mirror.co.uk/3am/celebrity-news/strange-obsession-31-year-old-man-who-5063377>). There are also online communities (e.g., <http://www.dateagranny.com>) for mesophilic or gerontophilic interests, though it is unclear how large these communities are and the extent to which there are real mesophilic or gerontophilic members.

Other Considerations

Nonexclusive Age Interests

Unlike sexual orientation for gender, where most people are exclusively heterosexual, with decreasing numbers of individuals showing some same-sex interest from predominantly heterosexual to exclusively homosexual, we not expect sharp differentiations for age categories where individuals show a sexual response to only one category. In other words, though most people are teleiophilic, this does not mean they show no interest in sexually mature adolescents or middle-aged adults. Instead, one would expect maximal attraction to particular maturity status and then descending attraction to adjacent categories. This has been described as a sexual response gradient in Seto, Lalumière, and Kuban (1999) and can be understood more broadly as a stimulus generalization gradient for age in sexual arousal patterns, as described by Blanchard et al. (2012; see Fig. 6).

It is presumably rare, however, for individuals to have widely different chronophilic attractions, for example, to both pre-pubescent children and to elderly adults. There are a few case studies of offenders who have sexually offended against both young children and the elderly (Monfort, Villemur, Lezy, Baron-Laforet, & Dröes, 2011). Unexpectedly, Seto and Eke

(2015) found a small number of child pornography offenders—the majority of whom are likely to be pedophilic based on self-report or sexual arousal patterns—who also had indicative amounts of pornography depicting elderly persons, where content was considered to be indicative on the basis of amount and/or organization of content using descriptive filenames and different folders for different pornography themes.

Thirty-nine percent of 215 pedophilic individuals and 59 % of 99 hebephilic individuals were nonexclusive in a sample of self-identified, help-seeking clients assessed by the Dunkelfeld Project (Beier et al., 2009). Table 3 shows the overlap between different age categories among clergy sex offenders, a distinct population of individuals—some of whom are likely to be hebephilic and some hebephilic—as described by Tallon and Terry (2008).

Nonexclusivity can encompass nonadjacent age categories as well, for example, some men are equally attracted to children and adults, just as other men are equally attracted to males and females. An interesting conceptual and practical problem is how to classify individuals who show similar or even equal levels of attraction. For example, is someone who is maximally interested in adults but also quite interested in prepubescent children nonexclusively teleiophilic or nonexclusively pedophilic? At what point does this classification tip? Or can there be another way to describe individuals with mixed or blended interests, based on their peak interests and the relative strength of other interests?

Surprisingly, given the DSM-IV-TR explicitly discussed exclusive versus nonexclusive forms of pedophilia, and given the relevance of this exclusivity distinction for theory, assessment and treatment, it is not clear how many pedophilic men are exclusive or nonexclusive. Whether pedophilic individuals (offenders or nonoffenders) are exclusive or nonexclusive is not always reported, and even when it is, it is not clear how this is operationalized. For example, is someone who is mostly attracted to prepubescent children but who has had a sexual relationship with an adult in their past deemed exclusive or nonexclusive in their pedophilia? At what point is someone nonexclusively pedophilic—which implies they are more attracted to children than to other age/maturity categories—or nonexclusive teleiophilic, which implies they are more interested in adults than prepubescent children, but clearly interested in prepubescent children as well? As noted by several different research teams, many nonoffending, gynephilic, teleiophilic men show some genital response to stimuli depicting adolescent or younger girls, but it is usually much less than the response they show to young adult women (Blanchard et al., 2012; Freund, McKnight, Langevin, & Cibiri, 1972; Seto et al., 1999). Are these men therefore nonexclusively teleiophilic?

In a recent study on victim choice polymorphism, Stephens, Seto, Goodwill, and Cantor (in press) observed that age polymorphism was more common than gender or relationship polymorphism in a large sample of sex offenders assessed at an outpatient clinic, meaning offenders with victims in two or more

age categories were more common than offenders with both male and female victims or both related and unrelated victims, suggesting there may be a hierarchical structure in male sexual orientations, with gender orientation at a higher order than age (and possibly other) orientations. In other words, gender may carry more weight than age preferences, so that a gynephilic, teleiophilic man would choose a sexually maturing adolescent or middle-aged woman over a man of any age. This cross-over is illustrated in Fig. 7. Consistent with this idea, Freund and Kuban (1993) examined the retrospective reports of a mixed group of 589 individuals attracted to girls, boys, women, or men and found that gender interests preceded age interests.

Logically, nonexclusive forms of age interests should be more common than exclusive forms, which is fascinating because gender orientation is more likely to be exclusive than nonexclusive (Blanchard et al., 2012; Lykins et al., 2010). Age seems to be different in a fundamental way from how gender orientation operates. Variation on the self-other dimension is mostly exclusive, with most individuals focused on others, though there can be some overlap, as in autogynephilia and interest in sexual partners among some transwomen (Lawrence, 2012) and Hsu et al.'s (2015) observations of autopedophilia among self-identified pedophilic men. Variation is mostly exclusive for living–nonliving, with most individuals exclusively attracted to living persons rather than objects or body parts; though, among those with object or body part fetishism, many are likely to be nonexclusive in that they are also sexually attracted to living, whole persons. Most individuals prefer conventional sexual activities, though there may be some enthusiasm for mild bondage and other variations (but not for more extreme sadism or masochism, or for activity paraphilias such as exhibitionism or voyeurism).

Change Over Time?

For gender orientation, there have been robust observations of some shift in sexual identities, attractions, or behavior over time, particularly among those women who are not exclusively androphilic (Diamond, 2008, 2015; Savin-Williams, Joyner & Rieger, 2012). Large-scale longitudinal surveys such as Add Health and GUTS show some change in gender interests over the lifespan, though the evidence of fluidity is stronger for women than for men (see Diamond, 2015; Savin-Williams, 2015).

Others have also reported that exclusive heterosexuality is relatively stable, with the greatest fluidity observed for bisexual men and for bisexual or lesbian women (Mock & Eibach, 2012). Ott, Corliss, Wypij, Rosario, and Austin, (2011) examined data from a large sample of adolescents and found that sexual fluidity was higher among females than males, and that sexual minorities were more likely to show fluidity in their sexual identities. Individuals who identify as bisexual may be particularly fluid: McCabe, Hughes, Bostwick, Morales, and Boyd (2012) reported data showing that 5 % of exclusively gynephilic men shifted

Fig. 6 Theoretical phallometric profiles for different chronophilic offender groups, from Blanchard et al. (2012). All profiles were calculated assuming apenile response of 10 cc to the proffered stimulus category. *Het* heterosexual, *Hom* homosexual, *Teleios* teleiophiles, *Hebes* hebephiles, *Pedos* pedophiles, *Pubes* pubescent, *Prepub* prepubescent

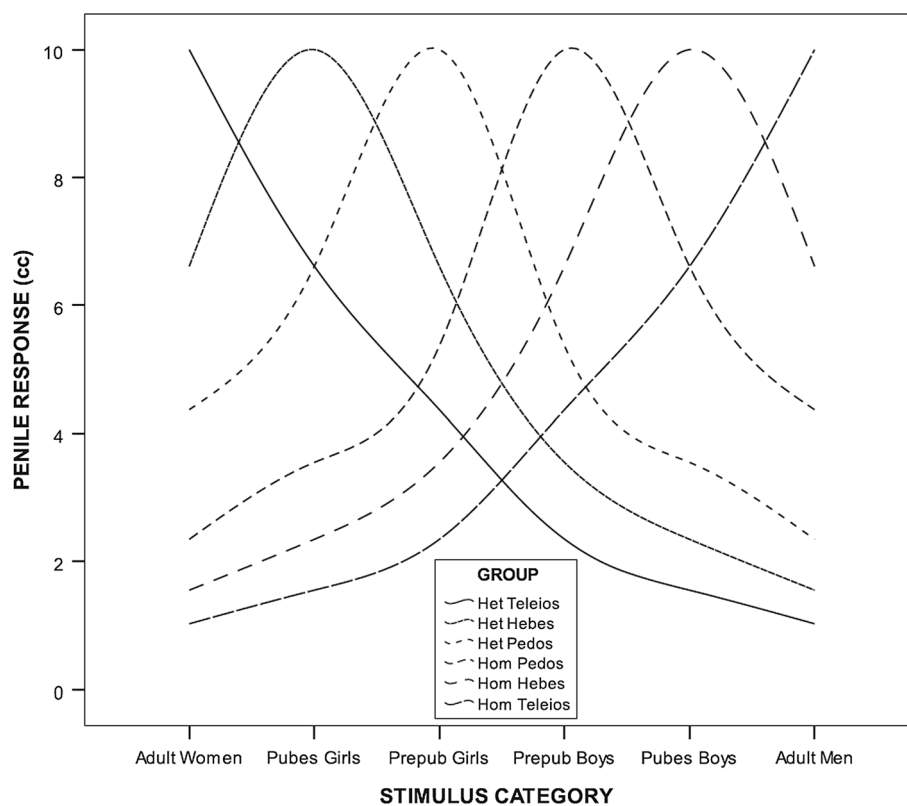


Table 3 Overlap across age/maturity categories, created from clergy sex offender data reported by Tallon and Terry (2008) (Reported as number of cases)

Pedophilia	Both prepubescent and pubescent victims	Hebephilia	Both pubescent and postpubescent victims	Ephebophilia
96	130 (29 %)	221	266 (28 %)	474

There were also 292 cases (34 % overlap) who had victims in both the pedophilia and ephebophilia categories. From Tallon and Terry (2008)

to mostly gynephilic, 38 % of exclusively androphilic men shifted to mostly androphilic, whereas 50 % of bisexual men shifted to mostly gynephilic or mostly androphilic.

Gender and age orientations may operate differently from each other, but one possibility from the stability of gender orientation literature is that teleiophilia is relatively stable over time, but other age variants, especially in their nonexclusive forms, have more potential to shift over time. There are few data on this and longer-term longitudinal studies have not been done. In particular, there are no studies following children or adolescents through the expected onset of chronophilic sexual interests around the time of puberty. Instead, studies have relied either on retrospective reports about the emergence of pedophilia or hebephilia, usually with clinical or forensic samples, or have followed offenders who are identified as pedophilic or hebephilic to examine sexual recidivism, that is, whether individuals commit sexual offenses again that might suggest a sexual interest in

children has persisted. A recent study examined the retrospective reports of 494 men who admitted having pedophilic or hebephilic sexual interests and who volunteered for a clinical assessment (Grundmann, Krupp, Scherner, Amelung, & Beier, 2016). Fifty-eight percent of those who admitted an attraction to prepubescent girls and 72 % of those who admitted an attraction to prepubescent boys reported the onset of this attraction around the time of puberty.

There has been recent debate about the likelihood of change in pedophilic sexual arousal as a result of treatment. Müller et al. (2014) reported data they interpreted as evidence that men showing pedophilic genital response patterns upon initial assessment showed much less response to children upon reassessment. What they failed to take into account, however, was a fatal flaw in their study design: they did not include a comparison group of men who showed nonpedophilic arousal at the initial assessment and who were also reassessed, and they did not consider regression to the mean as a more parsimonious explanation for their results, as

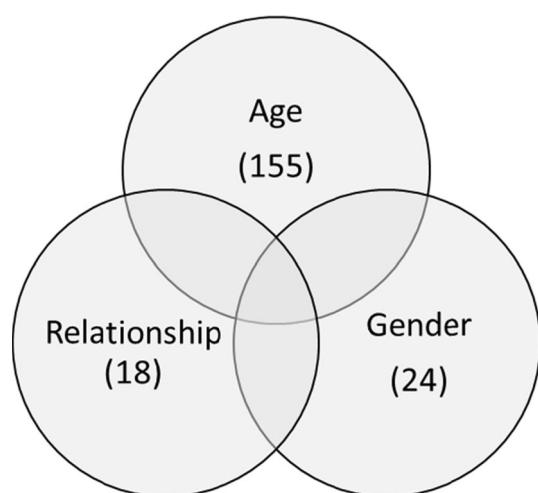


Fig. 7 Venn diagram illustrating polymorphism across victim age, gender, and relationship to perpetrator in a large sample of adult male sex offenders reported by Stephens et al. (in press). Phallometric profiles predicted by the revised bipolar model for heterosexual and homosexual pedophiles, hebephiles, and teleiophiles

was pointed out by a number of critics (Bailey, 2015; Cantor, 2015; Lalumière, 2015). A reanalysis of the data by Mokros and Habermayer (2016) further emphasizes problems with this study and the authors' interpretations. At this time, the null hypothesis, given expert consensus and empirical evidence that gender orientation changes little over time, especially among men, is that male chronophilias are stable over time, and thus the focus of any interventions for nepiophilia, pedophilia, or hebephilia is on management rather than "cure."

Another puzzle that needs to be solved is that normative age preferences do change in development from childhood to adulthood. Gynephilic boys are interested in similar-aged girls as well as older teenagers and women, but this shifts as they grow older so that, as young adults, they begin to show the male-typical preference for younger female partners (Kenrick, Keefe, Gabrielidis, & Cornelius, 1996). Also, as men grow older, their preference for younger partners remains, but the potential age range can grow, for example, gynephilic men in their 50s or 60s who might be interested in women from their 20s to their 50s (Buunk, Dijkstra, Kenrick, & Wamtjes, 2001). Perhaps pedophilia, hebephilia, and ephebophilia are related to some kind of disruption in this developmental process? Another possibility is that age interests can be influenced by experience, but only during a critical developmental window.

Future Directions

There is good evidence to suggest that pedophilia and hebephilia represent distinct chronophilias that can be understood as variations from the teleiophilia. Though strongly correlated, pedophilic and hebephilic men show differences in their sexual arousal to prepubescent and pubescent children, respectively (Stephens,

2015). There is some evidence to suggest that other chronophilias exist, but little is known about ephebophilia and almost nothing is known about nepiophilia, mesophilia, or gerontophilia. This includes a lack of scientific data about prevalences, gender or other demographic differences, etiology, exclusivity, and interaction with other dimensions.

The best way to examine the prevalences of chronophilias would be to ask questions about sexual interests—as reflected in fantasies, thoughts, urges, sexual arousal, and sexual behavior—using anonymous surveys, preferably with the extra protection of a certificate of confidentiality, so that any research data cannot be used to prosecute individuals admitting to illegal behavior. We could also turn to studies of pornography searches, pornography use, and detected behavior. Research on pedophilia and hebephilia is heavily tilted toward clinical and criminal justice samples, as discussed in depth by Seto (2008, 2013), but there is an emerging literature on self-identified pedophilic or hebephilic individuals from the Dunkelfeld Project in Germany and from anonymous or confidential surveys.

We can make predictions about atypical chronophilias, however, from theory and from empirical observations, and then test those predictions as best we can with the data that are available or that can be readily gathered. Relevant data include existing studies on pedophilia and hebephilia, clinical case studies of nepiophilia, dating or pornography use data, and anonymous surveys of interests in persons of different/age maturity categories. Predictions include:

- (1) The prevalences of sexual age orientations should decrease with distance from the species-typical teleiophilia, though the distribution might not be symmetrical (see #3 below).
- (2) Overlap in terms of nonexclusive age interests should be higher with adjacent chronophilias, because of fuzzy boundaries with regard to age and maturity stage. For example, there should be more overlap between pedophilia and hebephilia or between hebephilia and ephebophilia than between pedophilia and gerontophilia. This and the previous hypothesis can be tested by looking at overlap in chronophilias across the full lifespan.
- (3) Given gender differences in relative age preferences, men should be much more likely than women to exhibit chronophilias involving younger persons, whereas women may be more likely than men to show chronophilias involving older adults. This gender difference hypothesis is already supported for pedophilia and hebephilia, and thus the test involves a closer look at ephebophilia and other chronophilias. This hypothesis can also be tested using surveys about sexual preferences and analyzing dating and marriage data as indicators of sexual interests (though people can date or marry for nonsexual reasons as well).
- (4) We can expect interactions of age interests with other dimensions, such as gender orientation. There is already some evidence to suggest this. However, there is limited evidence

regarding the interaction of age with the other sexual orientation dimensions mentioned earlier. An exception is a study by Abel and Osborn (1992), who reported an association between fetishism and pedophilia, and a study by Hsu and Bailey (2015) that found an overlap between pedophilia and autopedophilia.

Physical characteristics, body shape and size are associated with different maturity categories, but this is an assumption because there is a paucity of research about what features—physical or psychological—are compelling in categories other than teleiophilia. There are some survey data from pedophilic survey respondents by Wilson and Cox (1983) and online forum posts in pedophilia forums, but not for other age interest groups. A really interesting, important, and fundamental question is, what are critical sexual cues for someone who is not a teleiophile? And what might that reveal about the normative development of species-typical sexual attraction to sexually mature adults? I expect the next Puzzles conference in 2020 will be very interesting if only some of this research is conducted in the next 5 years.

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Compliance With Ethical Standards

Conflict of Interest The author declares no conflicts of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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