

Physiological Arousal and Self-Reported Valence for Erotica Images Correlate with Sexual Policy Preferences

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ABSTRACT

Individuals do not always accurately report the forces driving their policy preferences. Such inaccuracy may result from the fact that true justifications are socially undesirable or less persuasive than competing justifications or are unavailable in conscious awareness. Because of the delicate nature of these issues, people may be particularly likely to misstate the reasons for preferences on gay marriage, abortion, abstinence-only education and premarital sex. Advocates on both sides typically justify their preferences in terms of preserving social order, maintaining moral values, or protecting civil liberties, not in terms of their own sexual preferences. Though these are the stated reasons, in empirical tests we find that psychophysiological response to sexual images also may be a significant driver of policy attitudes.

Key words: sexual policy attitudes, physiology and politics, erotica response

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Arguments employed in support of policy preferences are a central element of the political arena. Effective arguments may pull the undecided toward particular preferences, increasing the odds of policy enactment. Ineffective arguments may do the opposite, pushing individuals toward the other side and diminishing the likelihood the preference will become the law of the land. For at least two reasons the arguments individuals deploy in support of their political preferences do not always reflect the true forces driving their adoption of those policy stances. First, savvy political players may recognize that true reasons for preferences are not as compelling as alternative arguments in the marketplace of ideas. Scholars of morality politics, for example, suggest that calls to regulate “sinful” behaviors—e.g. prostitution, drug and alcohol consumption—are often justified on the grounds of maintaining social order even though empirical analyses suggest they are more about legislating moral codes than reducing collective social harm (Meier & Haider-Markel, 1996; Smith, 1999; Haider-Markel, 1999; Meier 1999).

Second, people are often unaware of the real reasons for their preferences and thus, unsurprisingly, cannot reconstruct those reasons with complete accuracy. The human mind is astonishingly good at constructing post hoc reasoning for attitudes and behaviors (Lodge & Taber, 2013). The conscious and unconscious inaccuracies in the reasons proffered to justify opinions may meld together because the inaccurate—but often more persuasive—rationalizations of policy preferences are likely to be internalized. Even if individuals provide partially inaccurate reasons for their preferences, they are not necessarily being duplicitous; they simply are offering explanations they may believe to be more accurate and complete than they actually are.

Understanding the real motivations underlying preferences—which may involve identifying factors that individuals firmly believe are irrelevant to their positions—is important because it might help explain why seemingly convincing, logical arguments can be so unpersuasive in

policy debates. Simply put, debate may take place on one set of points while the source of fundamental differences are not considered, let alone debated. Appreciation of the range of factors that formulate an individual's policy preferences could thus help explain why some policy debates remain so polarized and intractable, help illuminate the reasons policy divides can be so hard to bridge, and possibly reveal a path to negotiating those differences. Our primary goal in this paper is to examine whether certain policy preferences are associated with survey and psychophysiological responses to stimuli that seemingly have little relevance or direct connection with the reasons people give for their policy positions. We focus primarily on sex-related policy positions; more specifically, preferences on abortion, gay marriage, abstinence-only sex education, and premarital sex. The core question is whether preferences on these issues are products of more than the reasons typically employed to justify applicable policy positions.

Perhaps the closest parallel to this approach is found in the literature on racial attitudes, exploring the reasons people oppose (or favor) policies such as affirmative action and welfare. One group of scholars contends that opponents of affirmative action may have principled positions based on objections to government involvement in dictating the individuals that businesses should hire and universities should admit. Similarly, opponents of welfare may legitimately believe that such programs diminish personal responsibility and are deleterious for recipients in the long run (broadly referred to as principled conservatism; see Sniderman & Carmines, 1997; Sniderman, Cosby & Howell, 2000). Yet another group of scholars asserts that positions opposing affirmative action and social welfare are not really motivated by principled reasoning but rather by a new style of racism. In this telling, arguments about liberty and individual responsibility are fig leaves designed to hide the racially-based motivation for such positions, and principled arguments are invoked as more sellable in the marketplace of ideas

(Sidanius et al., 1996; Kinder & Sanders, 1996; Kinder & Sears, 1981; Feldman & Huddy, 2005; Petersen, 2012). Proponents of this perspective may not suggest that principled conservative arguments are consciously manipulative; indeed, the underlying motivation could be associated more with implicit rather than explicit cognitive processes (Pratto & Shih, 2000; Vanman et al., 2004). This finding suggests that individuals may not fully articulate the forces driving their opinions both because they are socially undesirable and possibly consciously unavailable.

Our study also builds on the findings of physiological response to other emotional/arousal domains, including the connection between self-reported disgust toward various scenarios and non-conscious response to disgusting images. In both cases, levels of disgust are predictive of attitudes toward issues like gay marriage (Smith, Alford, Hibbing, Oxley & Hibbing 2012; Balzer & Jacobs 2011). Whereas reactions to disgust and other negative stimuli appear to be universally valenced (though differing in intensity; see Smith et al. 2012; Hibbing, Smith & Alford 2014; Soroka & McAdams 2015), physiological responses to erotica are largely considered appetitive, though may be consciously evaluated both negatively and positively by different individuals. We posit the variance in these responses may help us understand preferences for four of the most contentious sex-related issues in modern American politics: abortion, gay marriage, sex education in schools, and premarital sex. In the research presented below, we find that individual attitudes on these positions do indeed correlate with variables that all sides generally treat as irrelevant to the larger policy debates.

Abortion. What reasons do people typically give for their opposition to abortion or for their support of abortion rights? The most common assertion of those opposed to abortion is that it is murder. In defending their position, topics usually addressed include the sanctity of life, the viability of the fetus, the nature of personhood, fetal development (when does the fetus begin to

feel pain or develop certain organs?), and the universality of human life -- whether that life is pre- or post-natal. Though public opinion on abortion has changed little over time, the ability of one side to frame sub-issues – like “partial-birth abortion” – seems to contribute to small shifts in aggregate attitudes (Wilcox & Norrander, 2002; Gerrity, 2010). More specifically, terms such as “partial-birth” – rather than “dilation and extraction” – cue individuals to think about the fetus as a person – pushing the focus of “rights” in that direction and away from the mother. Those supportive of pro-choice policies also employ the language of human rights but in the other direction. They believe women, at least at certain stages of gestation and in certain circumstances, have the right to decide to terminate their pregnancy (McCabe, 2005; Wilcox & Norrander, 2002; Adams, 1997; Sapiro & Shames, 2009; Luker, 1984). Note that neither side employs personal attitudes toward sex in defense of their own positions, though they may suspect it influences their opponents. For example, Kreeft (2013) decries the tendency of pro-choicers to insist that the controversy over abortion is really about “sex, not babies.”

Gay Marriage. Arguments over gay marriage also tend to ignore sex. Opponents stress that gay marriage will harm heterosexual marriage, going so far as to instigate passage (in 1996) of the federal Defense of Marriage Act (DOMA), which denied recognition of same-sex marriages for all federal purposes, including taxes, insurance, and Social Security benefits. Some opponents claim that the specific primary purpose of marriage is the perpetuation of the human race and the raising of children (Jost, 2008; TFP Student Action, 2013). They note that same-sex couples cannot procreate and that if gay couples were permitted to marry and even to raise children, that the interests of the child would be harmed because that child will be denied either a mother or father (Jost, 2008). Opponents further believe that same-sex marriage violates natural law and offends God; in fact, only about 10% of gay marriage opponents mention reasons other than

religious beliefs to support their positions (Pew Research Center June 6, 2013).

Supporters of same-sex marriage could not disagree more with the arguments just stated but, similarly, attitudes toward sex do not much factor into their arguments either. Supporters of same-sex marriage usually invoke the language of civil and human rights, pointing to the constitutional violation of denying things such as hospital visitations and legal protection to some citizens and not others. It was on just such grounds that gay marriage proponents successfully petitioned the U.S. Supreme Court in *United States vs Windsor* (2013) to declare key sections of DOMA unconstitutional. Previously, the court had ruled that homosexuals as a group did not reach the level of scrutiny required to indicate allegedly discriminatory laws were violations of the 14th Amendment (Dworkin, 1996). The dramatic changes in public opinion toward homosexuality (Pew Research Center 2013) and the subsequent court cases granting rights to gays and lesbians could be attributed to the development of rights-based arguments and to the fact that anti-homosexual laws merely demonstrate moral condemnation and do not seem to harm any other group (Dworkin, 1996). These rights-based arguments also may develop as homosexual individuals become more visible in the public eye, and there is evidence familiarity or “normalizing contact” is created in areas with denser LGB populations (Flores, 2014).

Sex Education. What sexually-related information should school-age children be given? This issue has also become firmly embedded in the political arena. Beginning in 1982 but increasing exponentially in 1996, the federal government provided funding for sex education programs teaching “the social, psychological, and health gains to be realized by abstaining from sexual activity” (Title V, Section 510 (A) of the Social Security Act). Until the program was allowed to expire in 2009, over \$1 billion was provided to schools willing to teach “abstinence only” as opposed to more comprehensive sex education. Many states also enacted laws designed to

control the information schools provided about sex and contraception. Though sex can hardly be avoided entirely in discussions of sex education, those arguing the pros and cons of “abstinence only” never use their own sexual tendencies as the justification for their policy preferences. Instead, they marshal data on the effectiveness (or ineffectiveness) of abstinence only programs in avoiding out-of-wedlock pregnancies and sexually transmitted diseases. Mostly, data are thrown back and forth concerning whether abstinence only or comprehensive sex education (which typically includes information on various birth control options) is more effective at curtailing teenage pregnancies (Santelli et al., 2006; Clemmitt, 2010).

Sex Before Marriage. Premarital sex may not seem like a public policy matter but it is relevant to many social issues and governmental policies and has occasionally been the direct subject of governmental action. Unwanted pregnancies frequently result from premarital sex, and the economic consequences are substantial. Various ideas have surfaced to address the issue of premarital sex. In early 2013, legislators in Idaho supported passage of a joint memorandum that would have urged the Federal Communications Commission to prohibit the implied portrayal or discussion of premarital sex on television anytime between the hours of 6 a.m. and 10 p.m. This legislation easily passed the relevant committee in the Idaho House of Representatives before losing momentum (Associated Press, 2013). Debates on premarital sex revolve around discussions of its economic and other consequences. People believe their preferences are based on concern for teenagers or for social order and stability, and they are understandably reluctant to believe that their own response to sexual situations could color their political preferences.

In sum, the rationale individuals provide for their preferences on policies concerning abortion, gay marriage, sex education, and premarital sex is typically couched in the language of human and civil rights, the perceived effectiveness of various policy proposals, and the need to maintain

social order. Rarely heard in these debates are individuals' claims that their own attitudes toward sex motivate their policy preferences. Indeed, we think it likely that most people would vehemently deny that the nature of their own response to sexual situations is at all relevant to their policy preferences. Are they correct?

Our goal was to determine whether an individual's responsiveness—both self-reported and involuntary (sub-threshold)—to sexual situations serves as a marker of their positions on sex related issues independent of the rationales typically provided. If preferences for abortion policy, gay marriage, abstinence only sex education, and premarital sex are formed only on the basis of perceived rights and policy effectiveness, the personal sexual responses of the individuals holding the preferences simply should not be relevant to those positions. We hypothesize, however, that being more negatively disposed and more physiologically responsive to sexual situations will correlate with preferences supporting greater regulation of individual choices related to sexual behavior; that is, with opposition to abortion rights, gay marriage, and premarital sex and with support for abstinence-only sex education.

The logic for the part of this hypothesis relating to self-reported response to sexually explicit material is straightforward. Those who report that certain sexual situations are not positively valenced are expected to be more likely to adopt positions that will diminish sexual activity (firm restrictions on abortion, bans on gay marriage, preaching abstinence, and doing whatever is possible to diminish premarital sex). Conversely, those who consciously assign positive valence to sex-related stimuli are expected to have more liberal attitudes to sexual choices and the regulation of reproductive opportunities.

The second component of sexual response—degree of physiological arousal in response to sexually explicit material—is a relatively novel proposition. Here we hypothesize that those who

are more physiologically aroused by sexual situations will be more likely to adopt “restrictive” policy preferences. Our measure of sub-threshold response (electrodermal activity) indexes arousal, but not valence. In theory it is possible that higher activation of this system could be triggered by arousal to a stimulus perceived as aversive. In other words, individuals who experience sexually explicit images as arousing and negatively valenced will show an increase in electrodermal activity, and so will those who experience those images as arousing as positively valenced. Previous research, however, consistently shows that such images are high arousal and positively valenced, and that electrodermal responses index subthreshold arousal to what is broadly considered universally appetitive stimuli in humans (e.g. Bradley et al 2001). If this is indeed the case, then individuals who self-report negative responses to erotic images may actually be having strong, non-conscious appetitive responses to sexually explicit materials. In other words, they may be more likely to view sex as something that must be kept in check, which explains why they self-report negative responses to erotic images even when they could be having strong, appetitive non-conscious responses. We develop this line of reasoning in the paragraphs below, though we remain cautious in our interpretation. Because we cannot randomly assign political preferences nor speak to the valence of our sub-threshold response, the underlying mechanisms and theory are speculation at this point and certainly a fruitful area of future research.

This conceptual framework is supported by numerous studies theorizing that affectively influenced opinions and behavior are rooted in activation of motivation systems that evolved to trigger reflexive responses to positive or negatively valenced stimuli as a means to promote fitness maximizing behavior in a given environmental context (Davidson, Jackson & Kalin, 2000, Konorski, 1967, Rolls, 2000; Lang, Bradley & Cuthbert, 1998). Most importantly for our

purposes, at least in terms of an implicit, reflexive response, erotica has been identified as a high arousal, hedonically (positively) valenced stimulus. It activates the appetitive motivation system. Empirical studies find sub-threshold physiological responses to erotic stimuli to be consistently associated with the activation of the appetitive motivation system, a finding that holds even when subjects self-reported ratings of these stimuli tend to be less positively valenced (Bradley et al., 2001, Lang et al., 1999; Codispoti et al., 2006; Schupp et al., 2006). Though this physiological response has been measured using everything from electroencephalography to cardiac measures, it can be captured using electrodermal activity (EDA), which reliably indexes activation of the sympathetic nervous system (Bradley et al., 2001).

So there is clearly an empirically strong basis for viewing erotica as a high arousal, positively valenced stimulus that triggers activation of the appetitive motivation system, which can be indexed simply and non-invasively with EDA. What is less clear is how activation of this system might influence political attitudes. Activation of this system operates largely outside of conscious awareness, and while existing studies show the emotional states created by this activation clearly play a role in attitudes and behavior, personal, situation and cultural imperative also play a role (Bradley et al., 2001, p. 276). For example, Lang and Yegiyan (2011) find that images of restricted substances (e.g. alcohol, cigarettes) activate an appetitive motivation system for young people, which may suggest public service campaigns to discourage use of these products may be hindered when these images are used. In other words, some individuals have an “appetite” for the forbidden.

If this is so, evolutionary psychology may provide a basis for hypothesizing a causal link between physiological responses to erotica and sex-related issue attitudes. Kurzban et al. (2010) suggest that preferred individual reproductive strategies are driving at least some issue attitudes

typically attributed to more abstract political orientations. They note that individual and environmental differences tend to promote one of two basic reproductive strategies; short-term sexual encounters versus long-term commitment. Either strategy makes sense in evolutionary terms in that they both can lead to reproductive success. Yet individuals tend to prefer one of these strategies over the other and Kurzban et al. argue that individual preference can have implications for issue attitudes. For example, attitudes on recreational drug use are often seen as anchored in broad ideological orientations. The correlation between political orientation and attitudes on drug use, however, largely disappears when controlling for preferred reproductive strategy. This suggests that those with a long-term strategy want recreational drug use regulated because it is perceived as promoting promiscuity, i.e. undermining the preferred long-term reproductive strategy. Those with a short-term strategy are more opposed to regulation for the same reasons (see also Quinteier et al 2013). Applied more broadly, this suggests that those with long-term reproductive strategies will reflexively support regulation of activities seen as undermining that strategy. If those activities are implicitly appetitive they are likely to be viewed at a gut level as particularly threatening to that strategy—highly tempting fruit that needs to be officially forbidden. In short appetites for the forbidden may sub-consciously drive their preferences to regulate behavior that would allow these appetites to be fed. This suggests that appetitive responses to erotica combined with a long-term reproductive strategy (belief in or preference for monogamy) may result in a desire to confine sex to heterosexual, married individuals who wish to reproduce.

Research Design. In the summer of 2010, we hired a professional survey organization to recruit a target sample of 350 who lived within a 50-mile radius of a mid-sized (U.S.) city. Though initial contact was via phone subsequent to random selection of an appropriate mix of

landline and mobile numbers, the prospective participants had to be willing, in exchange for \$50, to travel to a location in the city to complete the requested tasks, so these procedures clearly were not intended to produce a representative sample. In spite of the travel demands imposed, the response rate was more than respectable (AAPOR RR1 = 26 percent) and better than most standard telephone surveys. The resulting group (N=343) had appropriate demographics (54 percent female, mean age of 45, modal family income category in the \$40,000 to 60,000 category, with 55 percent having at least some college education). These numbers approximate those listed in the Statistical Abstract of the United States for the entire U.S. population. The one area where our participants do not look like the national population is race. Over 90 percent of our participants classified themselves as “white,” a figure that is consistent with the region of the country from which our pool was drawn but certainly not consistent with national figures.

Respondents completed an extensive computerized survey of their personality traits as well as their political preferences and activities. Following the survey, participants were escorted to a separate room where physiological measures were recorded as participants were exposed to a variety of visual stimuli on a computer screen placed at eye level. The physiological measure we employ here is electrodermal activity (EDA; also known as skin conductance). EDA is the most widely used indicator of activation of the sympathetic nervous system—sometimes known as the “fight or flight” response (Andreassi, 2006, p. 191-213; Dawson, Schell & Filion, 2007; Mutz & Reeves, 2005; Smith & Hibbing, 2011). This system prepares the body for action (either positive or negative action) and operates largely outside of conscious awareness. One involuntary consequence of sympathetic nervous system arousal is activation of eccrine sweat glands, which are densely concentrated on the palms. Activated sweat glands draw moisture to the surface of the skin, which in turn lowers the skin’s electrical resistance. This co-variation between eccrine

gland activation and the skin's electrical properties makes it a relatively simple matter to index activation of the sympathetic nervous system with a considerable degree of accuracy. This is typically done by placing two electrical sensors on the palms or fingers of a research subject and passing a small electrical current between these sensors. Lowered resistance to that current allows the measurement of sympathetic nervous system activity by using variation in units of electrical conductance (for primers on EDA and its measurement see Dawson, Schell & Filion, 2007; Stern, Ray & Quigle, 2001, p. 206-217; and Andreassi, 2006, p. 191-213). We employ this procedure to measure EDA, using two sensors placed on the non-dominant hand of the participant after applying an isotonic contact medium on the index and middle fingers.

After the non-invasive sensors were attached to the participants and prior to the onset of any stimulus, there was an acclimation period consisting of exposure to a black screen with a white plus (+) sign in the middle for 90 seconds. Immediately following this, changes in EDA were recorded while participants viewed 34 different images displayed on the screen for 14 seconds each. Between each image was an inter-stimulus interval (ISI) of 8 seconds. During the ISI, subjects were presented with the same black screen and fixation point used during the acclimation period. Stimulus images were drawn from the International Affective Pictorial System (IAPS), a large and widely-used collection of still images pre-tested for valence and arousal. As might be expected, average changes in EDA for each of the various images is positive, resulting in skewing to the right. To normalize the data, we took the natural log of each event's EDA average, which drastically decreased the skew of each measure. In order to minimize the effects of any outliers, each variable was winsorized such that the highest and lowest 1 percent of cases were set to the next highest and lowest values, respectively. Then the EDA for each individual image was taken as a proportion of the immediately preceding ISI,

standard procedures in the analysis of EDA (Cacioppo et al., 2007; Andreassi, 2006; Stern, Ray & Quigley, 2001). The end result is a ratio measure for each image for each individual where numbers greater than 1.0 indicate an increase in sympathetic nervous system activity in response to the target stimulus relative to the baseline of a neutral ISI.

To test our hypotheses on responsiveness to sexual situations, we included three sex-related images. These all depicted heterosexual couples either partially or completely naked in various stages of kissing or touching one another in a sexual manner. Measures of EDA activity in response to these images were clearly related to each other; EDA changes in response to each image loaded on one factor in a principle components analysis, with an eigenvalue = 1.73, and, after a varimax rotation, the images had the following factor scores: .83, .66, and .78 (Cronbach's alpha = .608). To generate an index reflective of this underlying factor, the EDA measure for each of the images was multiplied by that image's factor loading then added together. This serves as our index of physiological responsiveness to sexual situations.

Following the physiological portion of the experiment, participants completed a computer survey that included questions regarding their feelings and ratings of the images that were presented to them a second time for purposes of the survey items. The key question simply inquired, "How does this image make you feel?" and participants were able to select a number between 1 and 9, from positive to negative. The valence ratings provided by the participants for the three erotic images were entered into a principle components factor analysis, which resulted in a one-factor solution (eigenvalue = 2.10; Cronbach's alpha = .70). The factor loadings were multiplied by the participant ratings for each respective image and summed to create an additive index of self-reported response to sexual stimuli.

Based on the existing literature, we treat our EDA measure as an index of arousal, specifically activation of an individual's motivation system. It is important to emphasize that unlike many measures employed in the study of individual-level political behavior, EDA responses do not involve self-reports on the part of the research participant. The EDA response indexes a largely involuntary activation of the sympathetic nervous system. As such, measures of sympathetic division activity, like EDA, are capable of recording aspects of an individual's response that are not accessible in conscious awareness. For example, several studies have found that physiological responses to racial stimuli can reliably index attitudes on race-related policies, even though subjects reject race considerations as a basis for those attitudes (e.g. Vanman et al., 2004; Dambrun, Despres & Guimond, 2003). In our data, we find is no relationship between self-reported valence and physiological arousal to the erotic images ($r=.03$, $p=.56$), suggesting that these items are indeed measuring different responses: one is whether or not we like something and the other is whether or not we are aroused by that thing. This finding is consistent with the conclusions of several studies that self-reported and physiological response to stimuli play independent roles in explaining various social preferences, such as gay marriage (Balzer & Jacobs 2011; Smith et al. 2012).

As both folk wisdom and the psychology literature note, on average males and females react differently to sex-related material. More specifically, male reactions tend to be both more favorable and more intense (Lang, Greenwald, Bradley & Hamm, 1993). In our sample, there are significant mean differences in male and female responses to the erotic images, such that females report more negative feelings when viewing the images ($F(1, 331) = 30.18$, $p < .001$), and males have a significantly larger physiological reaction ($F(1, 323) = 11.61$, $p < .001$).

In the computer survey preceding the physiology experiment, participants were asked to respond to a large number of items concerning their personal and political tendencies. Most pertinent to the project at hand, they were asked whether they strongly agreed (5) to strongly disagreed (1) with a number of politically relevant positions or concepts. Our primary concern is with the extent to which the two measures of response to sexual images (self-reported valence and physiologically determined arousal or intensity) correlate with preferences on the four sex-related issues described earlier. However, in order to place these correlations in larger context, we include an array of 10 other issues that are divided into four topic clusters: sexual (abstinence-only sex education, premarital sex, abortion and gay marriage. Cronbach's alpha = .804), socially protective (illegal immigration, death penalty, gun rights, and military spending. Cronbach's alpha = .697), religious (Biblical truth, evolution, and school prayer. Cronbach's alpha = .807), and economic (health care, business regulation, and lower taxes. Cronbach's alpha = .749). We also report the correlation of the responses to sexual images with an overall index of each of these four policy clusters. These indices were created by performing a principle components factor analysis on each cluster and adding together each of the item values multiplied by their respective factor loading (the same procedure used for all of our indices described above).

Results. The bivariate correlations are presented in Table 1. The first column is the correlation of self-reported valence toward the three sexual images and a range of policy preferences coded so that more conservative positions are numerically higher. We see that participants reporting a negatively valenced response to the sexually explicit images indeed were more likely to prefer controlling or restrictive positions on the four sex-related issues. In other words, the more negatively valenced the response, the more likely the individual was to express support for

abstinence only sex education and opposition to gay marriage, abortion, and premarital sex. A similar pattern is evident for the three “religious” items with more negatively valenced responses to the sexual images correlating with support for Biblical truth and school prayer and opposition to evolution. With regard to the other two policy areas (socially protective and economic), no consistent relationship appears. This is not surprising since it is difficult to construct a reason why people’s response to sexual images should systematically relate to their attitudes on, for example, business regulation or the death penalty.

[Table 1 about here]

For comparison purposes, at the bottom of the table, we also include the correlations between responses to the sex-related images and party identification (1-7 with lower numbers indicating Democratic identification and higher numbers indicating Republican identification; “other” excluded) and self-reported ideology (1-7 with higher numbers indicating more conservative). These broader political positions are weakly ($p < .10$) related to self-reported response to sex-related images, with the positive signs of the coefficients indicating that more negative responses to sexual images tend to be associated with more Republican as well as more conservative identifications. It is clear from Table 1, that the connection between self-reported responses to sexual images and political preferences is primarily limited to sexual and religious policies.

As noted in the preceding discussion, personal responses to sex are seldom introduced into discussions of abortion, gay marriage, and sex education. Yet, our results show that those reporting a favorable response to sexual images tend to have different policy preferences than those reporting reactions that are unfavorable. Of course, our results do not permit the conclusion that variations in self-reported response to sexually explicit images are the *cause* of policy preferences on sex-related issues. What we can say is that those people who believe that the

human rights of the fetus are violated by the legality of abortion tend to be the same individuals who report that sexually explicit materials make them uncomfortable. Similarly, those who believe that human rights are violated by the illegality of same sex marriage tend to be the same individuals who report a favorable reaction to (heterosexual) erotica. This general pattern is confirmed with the other sex issues. Those who believe that abstinence-only sex education is effective at preventing premarital sex and unwanted pregnancies just happen to be the same individuals who report a negative response to sexually explicit images whereas those who prefer comprehensive sex education tend to be the same individuals who report a positive reaction to erotica. The consistent and statistically significant pattern of these results suggests they are more than coincidental but why should personal responses to sex affect beliefs about human rights (especially a differential concern for rights depending upon whether the rights are being applied to fetuses or to same-sex individuals) and policy effectiveness?

One obvious explanation is that personal sexual tendencies (which may be reflected in responses to erotic images)—rather than concerns for rights and liberties—are partially driving policy preferences. An alternate explanation reverses this causal order; i.e., particular policy preferences may beget systematic patterns of self-reported response to sexual stimuli.

Our second measure of responsiveness to sexual situations is more novel and should be able to shed additional light on the nature of the relationship between sexual responsiveness and policy preferences. Quite apart from the self-reported direction of reaction to sexually explicit material, is physiological response to such stimuli also related to policy preferences? The answer to this question is provided in the second column of Table 1. Though the effect sizes reported are slightly and understandably weaker than for self-reported valence, the evidence consistently

indicates that involuntary responses to sexual stimuli systematically co-vary with certain types of policy preference in the hypothesized direction.

[Table 1 about here]

Degree of physiological response to sexually explicit images appears to be completely unrelated to partisanship, ideology and all policy preferences *except sex-related issues*. More specifically, individuals whose skin conductance increases the most in response to sexually explicit images tend to oppose gay marriage and abortion. These relationships as well as the index combining preferences on sex-related policies are robust and statistically significant ($p < .05$). A weaker connection ($p < .10$) appears between physiological arousal and support for abstinence-only sex education, and the relationship between physiological arousal and opposition to premarital sex is in the expected positive direction but is not statistically significant. All told, those individuals with the greatest physiological response to sexual situations tend to be the same individuals who harbor preferences for greater regulation of sex-related behavior.

These results are correlational, and the issue of causality is open to debate. The strongest statistical relationships appear for the issues of abortion and gay marriage even though these would seem to be the issues least connected to responses to erotica. It may be that individuals with elevated physiological responses to sexual situations are more likely to believe that society needs to take strong action in order to keep sexual urges under wraps. From such a perspective, negative social consequences result if sexual urges are indulged. Abstinence should be the order of the day unless sex is between partners who are married to each other and who engage in sex primarily for the purpose of procreation.

Alternatively, it may be that policy preferences cause systematic physiological responses to erotica. For example, being raised in an environment in which sexual content is condemned may

condition someone to register a larger physiological response on encountering such stimuli. This response could be the result of the discomfort caused by sexual images or the kind of excitement often associated with forbidden fruit. It is notable, however, that no relationships exist between any non-sex political preferences (or either party identification or general ideological orientation) and physiological arousal to sexual images. If the causal arrow does indeed run from policy preference to physiological response, it does not seem to be attributable to a generally religious and politically conservative milieu that conditions heightened physiological response to sexual content. Rather it must be something specifically related to preferences on sex-related policy issues. Though our cross-sectional and correlational data certainly cannot resolve the causality issue, the weight of the evidence that can be extracted from such analyses points toward involuntary nervous system responses driving policy preferences rather than the other way around.

Bivariate relationships can only reveal so much. Because demographic variables also can be predictive of preferences on sex-related issues (Wilcox & Norrander, 2002), we tested the relationship between our two measures of response to sex-related materials and preferences for sex-related policies (using the index of the four sex-related items) in the context of a multivariate regression model controlling for education, income, age, gender and party identification. We also included a two-item measure of the Big 5 personality trait Openness to new experiences as this trait has been associated with attitudes toward sex/reproductive strategies (Quintelier et al. 2013). The results are provided in Table 2.

[Table 2 about here]

With regard to the demographic control variables, age is not significantly related with preferences for more restrictive sex-related policies but education ($p = .066$) and income ($p =$

.031) are negatively associated with more restrictive policy preferences. The preferences of educated and higher income individuals on this packet of sex-related policies runs toward supporting abortion rights, gay marriage, premarital sex, and opposing abstinence only sex education. Interestingly, gender is not a significant predictor of these sex attitudes, and even if we examine each sex attitude individually (results not shown), there are no significant mean differences between male and female preferences, which supports previous work on minute gender differences in abortion attitudes but runs counter to earlier findings showing that women demonstrate more support for homosexual rights (see Alvarez & Brehm, 1995; Sapiro & Shames, 2009; though it is quite possible that this difference is diminishing with the passage of the years).

Turning to the variables measuring responses to erotica, holding all other variables constant, self-reported valence of the erotic images is significantly related to sexual attitudes, such that the more negatively individuals rate their reaction to the images, the more they prefer restrictive sexual policies ($p < .001$). In addition, other things being equal, higher physiological response to these images is associated with preferences for more restrictive sexual policies ($p = .004$). These effects are significant, even when accounting for party identification and openness to new experiences (the latter of which is negatively correlated with conservative sexual attitudes, consistent with the extant findings).

The more important point, however, is that, regardless of the direction of the causal relationship, the finding of a clear connection between physiological arousal when exposed to sexual material and preferences on politically charged issues is an important one. It suggests that, quite apart from the response that people report having to such content, their physiological responses are markers of preferences on selected issues.

Discussion. It is important to avoid claiming more than empirical results permit, and this is particularly true when the topic of that research touches on highly emotional, value-laden topics. Individuals who oppose abortion, gay marriage, and premarital sex but support abstinence-only sex education also tend to have particular responses to sexual imagery. Specifically, they tend to self-report a negative response to that imagery and, more importantly, they tend to have stronger physiological (more specifically, sympathetic nervous system) responses to that imagery.

These results permit us to state with some confidence that both self-reported and physiological response to erotica systematically co-vary with preferences on salient sex-related policy issues. We contend that these results—particularly those showing the relevance of physiological response to preferences on sex-related issues—are important regardless of the causal sequence. If an individual's response to sexually explicit material evolves out of their socio-political context, it is noteworthy that this context eventually becomes ingrained in involuntary biological response patterns occasioned by exposure to sexual content. This being the case, it is likely that changing someone's preferences on sex-related issues will take much more than rhetoric on human rights or evidence on the effectiveness of particular policies since such evidence, in and of itself, would not alter physiological response tendencies.

A more controversial possibility, but one that is consistent with our empirical findings, is that physiological response patterns to sexual imagery reflect independent biological tendencies. These tendencies could be genetic (see Settle et al., 2010) or they could be the result of early development and previous environmental experiences (most likely a combination of all three) but at some point they manifest biologically and may independently influence policy preferences. This builds upon a growing body of research that has connected physiological responses to various domains, such as disgust, to conservative and liberal orientations, including attitudes

toward issues like gay marriage (Smith et al. 2012; Balzer & Jacobs 2011). If this is the case, the arguments employed on both sides of the controversies over sex-related policy issues are not fully reflective of the real reasons individuals hold the positions they do. Certainly some pro-life individuals are driven by concerns over the “sanctity of life” just as opponents of abstinence-only sex education could hold their preferences because of the evidence indicating that abstinence-only sex education is ineffective at preventing unwanted pregnancies. But personal physiological responses to sexual images remain a contributing factor to the differing policy preferences of individuals. The fact that sexual responsiveness correlates with only a narrow range of policy issues lends some credence to this interpretation but confident conclusions on the issue of causal order await experimental (or perhaps longitudinal) data. For now we can say that, as uncomfortable as it may be to entertain, the possibility exists that the reasons people offer for holding the preferences they do on sex-related issues may not fully represent all of the forces shaping those preferences.

For example, opposition to gay marriage is often based on references to a social experiment that may have negative effects on children. This reason would not account for the link between preferences on gay marriage and an individual’s response to heterosexual couples engaging in sexual acts. Perhaps a case can be made that individuals who respond strongly to sex-related images are more likely to have certain beliefs about the preferred nature of child rearing but it is difficult to see what that case would look like. Attitudes toward gay marriage are rapidly changing, similar to the way racial attitudes have evolved in the United States, but just as social scientists continue to uncover latent racism, studies such as ours may identify underlying emotions that are uncorrected by attempts at political correctness or favorable survey response.

Even more difficult to explain is the striking relationship between anti-abortion attitudes and responses to sexual stimuli. Pro-life appeals tend to focus on the fetus as a person who must be protected but our evidence suggests that for some people—particularly males—physiological responsiveness to sexual images is a factor. People may be unaware of the role of their own sexual tendencies in influencing their policy preferences and that their arguments about the sanctity of life may be a rationalization. Similarly, those arguing so ardently against abstinence only sex education need to accept that there is at least the possibility that if they responded more strongly and negatively to sexual imagery than they currently do, they might have a different view of the evidence on the effectiveness of abstinence only education. This fits with psychological theories regarding endorsing or engaging in lifestyle choices that fit with an individual's reproductive and perhaps life history strategy (Quintelier et al. 2013; Kruger & Fisher 2008; Kurzban et al 2010).

Whether individual responsiveness to sexual material is a reason people adopt the policy preferences they do or is instead a consequence of the social context associated with holding those positions, the finding that physiological response patterns are markers for policy preferences on important sex-related issues is novel and useful in indicating the relevance of tendencies that are seemingly tangential to the reasons proffered or in indicating the extent to which context can become internalized in physiological responses.

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Table 1: Bivariate Correlations between Self-Reported and Physiological Erotic Image Response and Political Preferences

	Self-Reported Valence	Physical Arousal
<i>Sexual</i>		
Abstinence	.24**	.10*
Gay marriage	.17**	.11**
Premarital sex	.34**	.08
Abortion	.23**	.14**
Sex Index	.30**	.13**
<i>Socially Protective</i>		
Illegal immigration	.10*	-.06
Death penalty	.00	-.02
Gun rights	.02	.08
Military Spending	.05	-.02
Protective Index	.05	.00
<i>Religious</i>		
Biblical Truth	.17**	.07
Evolution	.19**	.03
School Prayer	.12**	.04
Religious Index	.18**	.05
<i>Economic</i>		
Health Care	.10*	.02
Business Regulation	.03	-.06
Lower taxes	.08	-.06
Economic Index	.08	-.04
Political ideology	.16*	.07
Party identification	.15*	.04

Notes: * $p < .10$, ** $p < .05$. $n = 325$, adult population surveyed in 2010.

Self-reported valence: higher values = more negative rating of erotic images.

Physical response: proportion of change in EDA when viewing erotic images as compared to the inter-stimulus interval. Higher values = higher arousal. Issue attitude questions: "Here is a list of various topics. Please indicate how you feel about each topic. 1. Strongly agree 2. Agree 3. Uncertain 4. Disagree 5. Strongly disagree." Coded such that higher values indicate the politically conservative position. Political ideology: Labels are often misleading, but in general do you consider yourself liberal, conservative, or something in between liberal; moderate, leaning liberal; moderate; moderate, leaning conservative; conservative. Higher scores indicate more conservative. Party Identification: In general, do you consider yourself a Democrat, a Republican, or an Independent? strong Democrat; weak Democrat; Independent, leaning Democrat; Independent; Independent, leaning Republican; weak Republican; strong Republican. Higher scores indicate more Republican.

Table 2: Sexual Attitudes Regressed on Physiological Arousal and Self-Reported Valence to Erotic Images and Demographics

	B (S.E.)	p	β
Self-Reported Valence	.206 (.045)	.001	.229
Physical arousal	26.232 (8.924)	.004	.140
Education	-.175 (.095)	.066	-.089
Income	-.212 (.098)	.031	-.106
Age	.012 (.013)	.342	.045
Female	-.317 (.339)	.350	-.051
Party ID	.778 (.085)	.000	.440
Openness	-.188 (.070)	.007	-.128
Constant	-55.306 (20.543)	.007	
R ²	.348		
N	314		

Notes: Dependent variable = Index of positions on sex-related issues (created by combining the four sex-related issues listed in Table 1, higher values indicate a more conservative position). Self-reported valence: higher values = more negative rating of erotic images. Physical response: proportion of change in EDA when viewing erotic images as compared to the inter-stimulus interval. Higher values = higher arousal. Party Identification: In general, do you consider yourself a Democrat, a Republican, or an Independent? strong Democrat; weak Democrat; Independent, leaning Democrat; Independent; Independent, leaning Republican; weak Republican; strong Republican. Higher scores indicate more Republican. Openness = the mean of agreement with considering one's self "open to new experiences, complex" and disagreement with "conventional, uncreative." Higher scores indicate higher levels of Openness.