



The relationships of political ideology and party affiliation with environmental concern: A meta-analysis



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ABSTRACT

This study reports the results of two meta-analyses investigating the relationships between environmental concern and both political party affiliation and political ideology. Political party affiliation was found to have a substantial association with environmental concern ($\rho = 0.22$), as was political ideology ($\rho = 0.27$). Both relationships could also be corrected for error of measurement and restriction in range, yielding corrected effect sizes of $\rho' = 0.30$ and $\rho' = 0.67$, respectively. There was no evidence that coded study variables moderated the relationship with political ideology. Conversely, the analyses demonstrated strong evidence that the relationship with political affiliation was moderated by the year in which the study was conducted, as well as some evidence that education level was an additional moderator. Altogether, the results also suggest that the strengthening relationship between political affiliation and environmental concern is due primarily to partisan sorting, rather than to issue polarization on environmental issues.

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1. Introduction

The issue of environmental concern has garnered and sustained scholarly interest over the past half century, propelling research in sociology (e.g., Van Liere & Dunlap, 1981), psychology (e.g., Schultz, 2001), political science (e.g., Guth, Green, Kellstedt, & Smidt, 1995), anthropology (e.g., Arcury & Christianson, 1990), and communication (e.g., Zhao, 2012), among others. The definition of environmental concern varies somewhat across the literature, but most authors are consistent in using the term to refer to attitudes about environmental issues or perceptions that such issues are important. For example, Schultz (2001) defines environmental concern as the degree to which people worry about the consequences of environmental problems for themselves, other people, and the biosphere. Similarly, Fransson and Gärling (1999, p. 370) characterize environmental concern as “an attitude towards facts, one’s own behaviour, or others’ behaviour with consequences for the environment.” Other authors also see environmental concern as synonymous with a broader pro-environmental worldview (see Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000).

Some of the earliest work on environmental concern was

conducted in the mid-1950s and early 1960s, when authors began to document escalating levels of public awareness of and concern about air pollution (see De Groot, 1967; for a review). Subsequently, research has followed two primary trajectories. First, a substantial body of work has examined the consequences of environmental concern, namely environmentally-friendly behaviors and behavioral intentions. An example of such work is Minton and Rose’s (1997) study of consumer behavior, which found environmental concern to be a positive predictor of recycling and choosing to buy environmentally friendly products. Second, a large corpus has been devoted to uncovering determinants of environmental concern, many of the most thoroughly explored of which are sociodemographic variables. For example, Van Liere and Dunlap (1980) review numerous studies investigating age, social class, urban or rural residence, political variables, and sex. Other studies have also focused on the impact of variables such as religiosity (Guth et al., 1995) and race (Arp, 1994).

Of these correlates, political factors are a particularly interesting case. Generally, research has investigated two political variables: *political party affiliation* and *political ideology*. Political party affiliation refers to the major political party with which someone generally identifies. Political ideology, conversely, describes where someone falls on the spectrum of political beliefs, ranging from strongly conservative to strongly liberal. Many authors measure political ideology with a single item, although others favor more

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nuanced measures that address both economic and social political ideology. For example, [Buttel and Flinn \(1978\)](#) and [Constantini and Hanf \(1972\)](#) quantify ideology based on scales that capture attitudes toward both laissez faire policies and the welfare state.

There are several reasons why party affiliation and ideology deserve further investigation. First, the literature on the association between party affiliation and environmental concern has evolved substantially over the course of the last half-century. In the early 1970s, there was optimism that environmentalism might serve as a nonpartisan issue, uniting Democrats and Republicans (see [Dunlap, 1975](#); [Dunlap, 2008](#)). [Ogden \(1971, p. 246\)](#), for example, asserted that both parties were “certain to favor quality environment, to oppose pollution, to support conservation, and to admit the need to control population.”

Early studies, however, cast doubt on this consensus hypothesis. Several studies conducted from the 1970s to the 1990s (e.g., [Arp, 1994](#); [Dunlap, 1975](#); [Guth et al., 1995](#); [Tognacci, Weigel, Wideen, & Vernon, 1972](#)) revealed evidence that Democrats tended to be more concerned about the environment than Republicans, suggesting that there was in fact a partisan divide. In addition, a number of authors advanced theoretical arguments as to why political consensus on environmental concern was unlikely. [Dunlap \(1975\)](#), for example, suggested that environmental regulations are typically opposed by business and industry, require government intervention, and involve drastic and innovative action, all of which are unlikely to make them appealing to Republicans. In other words, it was logical to expect that more Democrats than Republicans would embrace pro-environmental principles, not that both parties would agree on this issue.

Despite its theoretical underpinnings, however, this political hypothesis (cf. [Van Liere & Dunlap, 1980](#)) also failed to find consistent support. Several studies reported a null relationship between party affiliation and concern (e.g., [Buttel & Johnson, 1977](#); [Dillman & Christenson, 1972](#); [Mazmanian & Sabatier, 1981](#)), and a few others actually found that Republicans had higher levels of concern than Democrats ([Barnett, 1970](#); [Buttel & Flinn, 1974](#), for low education group). Due to these conflicting findings, a number of early authors concluded that party affiliation was “not a crucial variable in explaining environmental concern” ([Van Liere & Dunlap, 1980, p. 191](#)) and that it had “no major relationship” ([Buttel & Flinn, 1978, p. 30](#)) with environmental attitudes.

More recently, however, the prevailing opinion in the literature has changed. Few authors now disagree that partisanship has an important association with environmental attitudes, pointing to what they see as evidence of a “widening gap” ([Dunlap & McCright, 2008, p. 27](#)) between Democrats and Republicans on environmental issues, particularly on the topic of climate change ([Guber, 2013](#); [McCright & Dunlap, 2011](#); [McCright, 2011](#)). Indeed, studies conducted in more recent decades consistently find positive and statistically significant relationships between party affiliation and environmental concern (e.g., [Czech & Borkhataria, 2001](#); [Deemer, 2009](#); [Rainey, 2008](#)), with few, if any, studies reporting null or negative effect sizes.

In sum, the literature on the relationship between political affiliation and environmental concern has clearly shifted from one of skepticism and dismissal to one of confident acceptance over time. What remains unclear is the reason for this shift. A systematic investigation of these findings is necessary to examine whether there has been a change in the relationship itself or if there are other factors, like changes in methodology or interpretation, that account for the transition.

Second, although some authors have treated party affiliation and political ideology as interchangeable (e.g., [Longo & Baker, 2014](#)), the literature suggests that there is good reason to examine their relationships with environmental concern

separately. Specifically, the conflicting findings and historical skepticism evident in the literature on party affiliation are absent from the literature on political ideology. Instead, authors consistently find that liberalism is positively and statistically significantly related to environmental concern (e.g., [Buttel & Flinn, 1978](#); [Constantini & Hanf, 1972](#); [Dillman & Christenson, 1972](#); [Van Liere & Dunlap, 1980](#)). A few studies have reported null relationships between political ideology and concern (e.g., [Arp, 1994](#); [Klineberg, McKeever, & Rothenbach, 1998](#); [Ray, 1980](#)), but findings of negative relationships are rare or nonexistent. As a result, both early (e.g., [Buttel & Flinn, 1976](#)) and contemporary (e.g., [Schuldt & Roh, 2014](#)) authors have acknowledged the importance of political ideology in explaining environmental attitudes.

Altogether, this consideration of the literature on the relationships of political ideology and party affiliation with environmental concern indicates that there are several issues that warrant examination with a meta-analysis. Specifically, greater clarification is needed of the role of party affiliation, including the true effect size, whether or not it has changed over time (as the literature appears to suggest), and the source of the conflicting findings among early studies. It would also be beneficial to clarify whether or not the relationship of environmental concern with political ideology differs from the relationship with party affiliation and if the findings on political ideology are as consistent as they appear to be.

A meta-analysis also provides the opportunity to investigate possible moderators of the relationship between political variables—either political ideology, party affiliation, or both—and environmental concern. Specifically, there are three major threads of research in the literature suggesting that level of education, the measure of environmental concern used, and the year of data collection may be important moderators of these relationships.

1.1. Education

By itself, education is consistently found to be a positive predictor of environmental concern (e.g., [Arcury & Christianson, 1990](#); [Buttel & Flinn, 1974](#); [Tognacci et al., 1972](#); see [Van Liere & Dunlap, 1980](#), for a review), but the picture becomes more complicated when the association is broken down by political party affiliation and political ideology.

The idea that education might moderate the relationship between political variables and environmental concern was first introduced by [Buttel and Flinn \(1978\)](#), who felt non-additivity might account for inconsistent findings on sociodemographic variables in the literature. Indeed, the results of [Buttel and Flinn's](#) study revealed that among Republicans, party affiliation and concern were correlated only $r = -0.08$ when educational attainment was low, but $r = -0.27$ when it was high. Among Democrats, on the other hand, party affiliation and concern were correlated only $r = 0.06$ among the less educated group, but $r = 0.28$ among the more educated one. In sum, the relationship between environmental concern and political affiliation was stronger in the more educated group than the less educated group, suggesting that there was a moderating effect of education.

More recently, the same pattern has been uncovered by researchers examining concern about climate change. For example, [McCright and Dunlap \(2011\)](#) report that “the effects of educational attainment ... on beliefs about climate science and personal concern about global warming are *positive* for liberals and Democrats, but are *weaker or negative* for conservatives and Republicans,” (p. 175, emphasis original). In other words, as educational attainment increases, attitudes on climate change tend to diverge, producing a larger effect size for party affiliation or ideology. Similar findings have also been reported by several others (see [McCright, 2011](#), for a review).

There are several reasons why education might moderate the relationships of party affiliation and political ideology with environmental concern. For one, there is some evidence that Republicans and conservatives self-select into majors that are less environmentally friendly than do Democrats and liberals (Ewert & Baker, 2001; Lang, 2011), which may serve to strengthen and reinforce pre-existing environmental beliefs. Even when students with different political views choose the same major, their pre-existing attitudes may also be affected differently. Kelly-Woessner and Woessner (2008), for example, demonstrated that students' perceptions of the partisan distance between themselves and their professor had a substantial impact on their learning outcomes. Given that the proportion of conservative and Republican faculty is much higher in business and economics departments than in departments such as biology and chemistry (Rothman, Lichter, & Nevitte, 2005), conservative students may find the (anti-environmental) arguments of their business professors more convincing than the (pro-environmental) arguments of their natural sciences professors; the opposite would be true for the liberal and Democratic students. If so, then student views would be expected to become somewhat more polarized with each class.

Another potential explanation is that more educated individuals have better-integrated political beliefs. Specifically, Converse (1964) argues that although well-educated people generally vote for the political party that aligns with their own positions on political issues, less-educated populations may not necessarily do so. One reason why this may be the case is that people tend to process political information differently depending on their level of civic knowledge. For example, Popkin and Dimock (1999) explain that people with higher levels of political knowledge are better able to understand how new information fits within their existing political framework, and are also better at identifying differences between political parties and candidates. Thus, more educated individuals are more likely to understand whether or not supporting pro-environmental policies is consistent with their other political views, as well as which party would be likely to support the same environmental decisions (also see Hart, Nisbet, & Myers, 2015; Kahan et al., 2012).

Regardless of the reason, these studies suggest that the relationships of party affiliation and political ideology with environmental concern will be stronger as education increases. If education serves to polarize views—driving concern higher among Democrats and liberals, but lower among Republicans and conservatives—then these political variables can be expected to produce larger effect sizes among populations with more education than those with less education.

1.2. Measurement

Measurement issues have plagued the environmental concern literature for some time. For one, several authors have argued that *environment* or *environmental concern* are poorly conceptualized, suggesting that extant measures have low face or content validity. For example, Buttel and Johnson (1977, p. 49) voiced early concerns that there were “significant controversies” in the literature, “traceable to noncomparable dependent variables and the multidimensionality of environmental beliefs.” The most popular measure of environmental concern, the new ecological paradigm scale (NEP) (Dunlap & Van Liere, 1978; Dunlap et al., 2000), has also been subject to a variety of criticisms. For example, LaLonde and Jackson (2002) have suggested that many of the NEP items have low face validity and are overly simplistic and outdated. In their study of the NEP, open-ended comments from participants also indicated that several items were ambiguous and unclear. Similarly, Arcury and Christianson (1990) found that one of the NEP items—“Earth is

like a spaceship with limited room and resources”—was highly problematic: “several respondents comment[ed] that the question was ‘weird,’ and threaten[ed] to discontinue the interview,” (p. 405).

In addition, several authors have pointed out that evidence for construct validity is poor for many well-established environmental concern scales. Cruz and Manata (2015), for instance, found that neither the NEP nor Weigel and Weigel's (1978) popular environmental concern scale fit the authors' proposed factor structures, even though they are often assumed to do so. This criticism of the NEP has also been made by several others (see Dunlap, 2008, for a review), and concerns about the quality of the NEP are not assuaged by Dunlap's (2008, p. 13) argument that “researchers should use the Revised NEP Scale and then decide on the basis of their data analysis whether to treat it as a single or multidimensional scale.”

Beyond general concerns about the quality of many measures of environmental concern, there have also been studies illustrating that the relationships of party affiliation and political ideology with environmental concern are moderated by the *content* of the measure used. Van Liere and Dunlap (1981), for example, found that the relationship between political ideology and environmental concern ranged from $r = 0.04$ to $r = 0.23$ depending on the scale used. The weakest correlation was with reported environmental behavior, the strongest with attitudes toward protecting natural resources and environmental spending. Klineberg et al. (1998) also found varied relationships, with multiple regression coefficients ranging from $\beta = -0.08$ to $\beta = 0.68$. In this case, correlations were weaker with measures such as concern about local pollution and the need for humans to adapt to the environment, and stronger with measures such as concern about pollution of lakes and streams and the need for stronger environmental regulations.

Taken as a whole, this review of the literature suggests there are two ways in which measurement of environmental concern might cause variation in effect sizes. First, there may be substantial artifactual variance introduced by poor construct validity and unreliability (Hunter & Schmidt, 2004). Second, the relationships of party affiliation and political ideology with environmental concern may actually be moderated by the content of the measure used. For example, these political variables may have strong relationships with attitudes toward government spending on environmental protection or toward government regulations, as these are generally antagonistic to Republican and conservative viewpoints (as suggested by Dunlap, 1975). On the other hand, there may be weaker relationships with attitudes toward individual behaviors such as recycling, which are more widely accepted and minimally controversial.

1.3. Year

A final possible moderator of the relationships of party affiliation and political ideology with environmental concern is the year of data collection. Over time, general interest in and support for environmental initiatives in the United States has fluctuated (e.g., Dunlap & Catton, 1994; Dunlap, Xiao, & McCright, 2001), peaking in the 1970s before gradually declining to its present levels (Gallup, 2017). Recent research also suggests that this overall change in attitudes has been accompanied by a growing political divide, whereby Republicans and conservatives have adopted an increasingly dismissive attitude toward the environment relative to their Democratic and liberal counterparts (Dunlap & McCright, 2008; Dunlap et al., 2001; Guber, 2013). In particular, recent research on climate change attitudes (Dunlap & McCright, 2008) suggests that the discrepancy in concern between the two parties may be increasing. As a result, there is good reason to investigate how the relationships of party affiliation and political ideology with

environmental concern may have changed over the years.

Examining these relationships over time also provides an opportunity to clarify the processes responsible for any changes that are observed. Specifically, whereas some authors have argued that polarization on environmental issues has occurred (Dunlap & McCright, 2008; McCright & Dunlap, 2011; McCright, 2011), others suggest that partisan sorting has been responsible for recent changes in public opinion (Guber, 2013; Levendusky, 2009). *Issue polarization* refers to the process by which attitudes diverge over time; Democrats and liberals develop more positive environmental attitudes, Republicans and conservatives develop more negative environmental attitudes, or both. *Sorting*, on the other hand, is the process by which liberals and conservatives come to be sorted by political party to a greater degree over time; more liberals come to identify as Democrats, and more conservatives come to identify as Republicans (see Fiorina & Abrams, 2008; Levendusky, 2009; Mason, 2014).

These two processes can be differentiated by examining the relationships of environmental concern with both political party and political ideology over time. First, if issue polarization has occurred, it will be evident from an increase in the effect size for both ideology and political party over time. Because issue polarization is a result of attitude change, growing discrepancies can be detected when either political party or ideology is examined. In contrast, sorting will be evident from an increase in the effect size for political party, but not in the effect size for ideology. The key difference is that sorting results from changes in voting patterns, not in attitudes. If attitudes remain the same, so does the attitudinal discrepancy between liberals and conservatives and, therefore, the relationship between ideology and concern. If voting patterns change, on the other hand, the attitudinal discrepancy between the parties would be expected to grow. As conservatives come to make up a higher proportion of the Republican Party, the party's attitudes become more conservative on average. In turn, as liberals come to make up a higher proportion of the Democratic Party, the party's attitudes become more liberal on average. As a result, the discrepancy in environmental attitudes between the average Republican voter and the average Democratic voter grows, even though the attitudes of individual voters have remained the same. In sum, the present study will permit investigation of whether or not the relationships of ideology or political party with environmental concern have changed over time and, if so, why.

Overall, this meta-analysis will strive to clarify the evidence on the relationships between political variables and environmental concern. Specifically, the object will be to assess the magnitude of the associations of political ideology and political affiliation with environmental concern, as well as to examine whether or not education, measure, and year are moderators of these relationships. Taken together, the results of the two analyses will also speak to ongoing discussions about issue polarization and partisan sorting in this literature.

2. Method

2.1. Search criteria

Several databases, including Google Scholar, PsycInfo, PsycArticles, Communication and Mass Media Complete, Communication Abstracts, JSTOR, ProQuest Dissertations and Theses, and the Social Sciences Citation Index were used to search for articles to be included in the meta-analysis. Keywords such as “environmental concern,” “environmental attitudes,” “political,” “political ideology,” and “political affiliation” were used to identify relevant articles in these databases. The reference sections of relevant articles were also examined for additional articles of interest. Ultimately,

225 articles were identified as potentially relevant to the meta-analysis and were examined in more detail.

2.2. Inclusion criteria

Studies were included in the meta-analysis if they met three criteria. First, the study had to include a measure of political affiliation, political ideology, or both. Second, the study had to include a measure of environmental concern. Because environmental concern has frequently been considered a general measure of environmental attitudes (see Dunlap, 2008), studies that did not use the term *environmental concern* but still measured general or specific environmental attitudes were also retained. In total, 56 articles were eliminated because they did not measure these variables. Studies that focused on pro-environmental behaviors rather than attitudes ($n = 6$), such as Weigel (1977), were excluded, as were studies focusing on beliefs, knowledge, or risk perceptions ($n = 5$), such as Smith and Leiserowitz (2012). Studies were also excluded if the authors intentionally attempted to change environmental attitudes using a post-test only design ($n = 3$). For example, Haggard, Yao, and Cai (2014) measured concern about climate change only after participants were exposed to a climate-change related advertisement. Finally, the study had to provide sufficient information to calculate the bivariate relationship between the political variable(s) and environmental concern. Thus articles such as Neuman (1986), which stated only that the relationship between political stance and commitment to conservation was non-significant, could not be included in the meta-analysis ($n = 23$). It was also not possible to include several studies that reported only multivariate effects ($n = 49$; e.g., Honnold, 1982; Johnson, Bowker, & Cordell, 2004; Michaud, Carlisle, & Smith, 2008).

Another issue related to inclusion in the meta-analysis was the use of a single data set by multiple authors or in multiple studies by the same author. For example, the same ideology effect size is reported in two different studies by Buttel and Flinn (1976, 1978), as well as by both Bohr (2014) and Clements, McCright, and Xiao (2014). In such cases, a judgement was made about which paper provided the better estimate of the effect size, and the other paper was disregarded ($n = 14$). For example, Buttel and Flinn (1978) was selected over Buttel and Flinn (1976) because it included an additional measure of ideology that could be used to calculate the effect size estimate. A total of 69 articles met all of the inclusion criteria and were retained for coding and analysis.

2.3. Coding

Studies meeting the inclusion criteria were coded for several features. Coded characteristics included the data collection year, sample size, nature of the sample, and nature of the measures used.

2.3.1. Sample characteristics

A note was made of proportions or means and standard deviations for political ideology and party affiliation. When sufficient information was available, each sample's mean educational attainment was also recorded. To examine the effect of education, each study was assigned a code from 1 to 7 based on the mean level of education in the sample (1 = *no formal education*, 7 = *some advanced study or more*; see Table 1, $M = 5.07$, $SD = 0.79$). Education level was recoded in this way in order to make this information readily comparable across studies, as the primary studies rarely used the same categorization scheme.

2.3.2. Measurement characteristics

When sufficient information was available, each study's

Table 1
Coding of key moderators.

	Frequencies
<i>Education</i>	
1 = no formal education	0.0% (<i>n</i> = 0)
2 = some primary school	0.0% (<i>n</i> = 0)
3 = completed primary/some high school	1.8% (<i>n</i> = 2)
4 = completed high school/tech or vocational school	4.6% (<i>n</i> = 5)
5 = some college/Associate's	23.9% (<i>n</i> = 26)
6 = completed Bachelor's	9.3% (<i>n</i> = 10)
7 = some advanced study or more	0.9% (<i>n</i> = 1)
<i>Measure of environmental concern</i>	
1 = general	30.8% (<i>n</i> = 32)
2 = economic	18.3% (<i>n</i> = 19)
3 = government action	4.8% (<i>n</i> = 5)
4 = combination of 1–3	13.5% (<i>n</i> = 14)
5 = other	32.7% (<i>n</i> = 34)

Note. The education code represents the mean level of education for the sample.

measures were coded for the following features: the scale used to measure political ideology, the reliability of the political ideology measure, the mean and standard deviation or proportion for the political ideology measure, the reliability of the environmental concern measure, the mean and standard deviation for the environmental concern measure, and the content of the environmental concern measure. The content categories (see Table 1) included general attitudes (e.g., “How concerned are you personally about improving and protecting the environment?” and “Everyone has a responsibility to improve their environmental footprint.”), economic issues (e.g., “Economic growth is more important than environmental protection” and “I would be willing to pay higher taxes to reduce global warming.”), government action (e.g., “Government agencies should support environmental education programs for adults.” and “The government should introduce legislation to reduce greenhouse gases.”), a combination of the three, or other (e.g., attitudes toward oil drilling, concern about climate change). All of the studies used only single-item measures of party affiliation, so there were no reliability coefficients or content differences to code for this variable. Instead, only the proportion or mean and standard deviation of the political affiliation measure were recorded.

2.4. Analysis procedure

After effect size estimation and coding were complete, two meta-analyses were performed, one to obtain an overall effect size for the relationship between political ideology and concern, and one to obtain an overall effect size for the relationship between political party affiliation and concern. Analyses were conducted using the Hunter-Schmidt Meta-Analysis Programs (Schmidt & Le, 2014), which employ a random effects model, and proceeded in three stages. First, a bare-bones analysis was conducted, correcting the effect only for sampling error. Second, the analysis was repeated with additional corrections for measurement error and restriction in range. Finally, if substantial variance in effect sizes still remained after the corrections for artifacts, moderator analyses were conducted on coded study characteristics.

2.4.1. Error of measurement

In both meta-analyses, the correction for error of measurement was based on artifact distributions, rather than on individually-corrected effects (see Hunter & Schmidt, 2004). For the effect of ideology on environmental concern, it was possible to correct for error of measurement in both the independent variable (r_{xx} ranged from 0.37 to 0.86) and the dependent variable (r_{yy} ranged from 0.42 to 0.96). For the effect of affiliation on environmental concern, it

was only possible to correct for error of measurement in the dependent variable (r_{yy} ranged from 0.42 to 0.89). Error of measurement in the independent political affiliation variable could not be estimated accurately, due to the use of one-item measures.

2.4.2. Restriction in range

As with error of measurement, the correction for restriction in range was based on artifact distributions. For both meta-analyses, this distribution was estimated for the independent political variable. Correction coefficients were obtained from primary studies reporting either means and standard deviations or proportions for the political variable. For each study, the largest possible coefficient of variation (COV) for a dichotomous variable, 1.00, served as a reference value.

The COV was used as a reference rather than the standard deviation because studies varied in the number of scale points used and in whether the measure was continuous or dichotomous. Correction coefficients were then obtained by comparing the obtained standard deviation for each study to the standard deviation that would have been obtained had the COV been 1.00 (u ranged from 0.29 to 1.42 for affiliation and from 0.06 to 1.84 for ideology).

3. Results

The results of the meta-analyses are presented in two sections. The first section reports the relationship between political ideology and environmental concern; the second reports the relationship between party affiliation and environmental concern. See Table 2 for effect sizes from each study.

3.1. Political ideology

A total of 75 effect sizes were extracted from the literature on ideology and environmental concern, from a total of 52 articles. The distribution of these effect sizes approximated a normal distribution, with minimal skewness and kurtosis. The total sample size for these studies was $N = 90,741$, with a mean sample size of $N = 1209.88$ ($SD = 2375.97$) and a median sample size of $N = 548$. The distribution of sample sizes was highly positively skewed and leptokurtic, with most samples falling in the range of 100–500 participants. The vast majority of these samples were taken from the U. S. population, although a few were drawn from other countries ($n = 10$). There was little evidence to suggest that sample size was correlated with effect size ($r = -0.08$, $p = 0.48$) or with the year in which data were collected ($r = -0.14$, $p = 0.23$).

The articles from which these effect sizes were obtained were published between 1972 and 2014, on data sets collected between 1970 and 2014. Although the number of data sets collected per decade was fairly constant across these years, articles were published at a much greater rate after 1990. As a decade, the 1990s emerged as a clear peak of publication activity, with 29 of the 52 papers published during this time.

3.1.1. Bare-bones analysis

The results of the bare-bones analysis demonstrated that political ideology has a statistically significant positive relationship with environmental concern. The observed mean correlation was $r = 0.27$ (observed $SD = 0.16$), and the sample-size weighted mean correlation was $\rho = 0.27$ ($SD_{\rho} = 0.15$, 95% CI [0.24, 0.31]). The percentage of variance in effect sizes accounted for by sampling error was only 2.92%, suggesting that other artifacts or moderators were responsible for substantial variance.

It is also worth noting that in a study conducted with a sample of 1209 people (the average sample in this set of studies), the observed mean correlation of $r = 0.27$ would be statistically

Table 2
List of studies included in meta-analysis.

Author(s)	Year	Study/Dataset	Political ideology		Political affiliation		Education	Measure
			N	r	N	r		
Allen, Castano, & Allen	2007	1	192	0.33	—	—	—	1
Arp	1994	1	517	0.02	615	0.15	5	1
Arpan, Opel, & Lu	2013	1	—	—	274	0.31	5	5
Baldassare & Katz	1992	1	1017	0.17	1017	0.14	—	1
Barnett	1970	1	—	—	1838	-0.06	4	1
Blankenau, Snowden, & Langan	2007	1	—	—	402	0.21	5	4
Bohr (GSS 2010)	2014	1	1043	0.34	—	—	5	1
Buttel & Flinn	1974	1	—	—	367	-0.01	3	5
Buttel & Flinn	1978	1	548	0.23	—	—	3	3
Buttel & Johnson	1977	1	231	0.29	231	0.08	—	4
Casey & Scott	2006	1	—	—	142	0.25	5	1
Clayton et al.	2014	1	3588	0.33	—	—	—	5
Clements, McCright, & Xiao (GSS 2010)	2014	1	—	—	1430	0.33	5	4
Connerly	1986	1	—	—	983	0.04	—	3
Constantini & Hanf	1972	1	303	0.33	269	0.14	6	5
Cottrell	2003	1	209	0.22	—	—	6	4
Czech & Borkhataria	2001	1	—	—	423	0.16	5	3
Deemer	2009	1	943	0.35	943	0.19	5	5
Deemer	2009	2	463	0.30	463	0.20	6	5
Dunlap	1975	1	229	0.09	148	0.20	5	3
Dunlap & McCright (Gallup 1997–2008)	2008	1	—	—	1030	0.18	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	2	—	—	1030	0.26	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	3	—	—	1030	0.28	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	4	—	—	1030	0.31	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	5	—	—	1030	0.38	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	6	—	—	1030	0.34	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	7	—	—	1030	0.42	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	8	—	—	1030	0.40	—	5
Dunlap & McCright (Gallup 1997–2008)	2008	9	—	—	1012	0.43	—	5
Dunlap, Van Liere, Mertig, & Jones	2000	1	676	0.32	676	0.22	—	1
Ellis & Thompson	1997	1	706	0.29	706	0.24	6	1
Ellis & Thompson	1997	2	377	0.39	377	0.38	6	1
Evans et al.	2007	1	100	0.44	—	—	6	1
Feinberg & Willer	2013	1B	476	0.28	—	—	5	5
Feygina, Jost, & Goldsmith	2010	2	563	0.40	—	—	5	1
Forgas & Jolliffe	1994	1	621	0.45	—	—	5	5
Guth, Green, Kellstedt, & Smidt	1995	1	3418	0.50	3418	0.39	—	4
Guth et al.	1995	4	1781	0.65	1781	0.63	—	2
Guth et al.	1995	5	1950	0.41	1950	0.38	—	2
Guth, Kellstedt, Smidt, & Green	1993	1	4995	0.65	—	—	—	4
Heleski, Mertig, & Zanella	2006	1	576	0.33	—	—	—	5
Hess-Quimbata & Pavel	1996	1	18,887	0.16	—	—	4	5
Hickson	2012	1	285	0.34	—	—	—	2
Hoffman	2013	1	—	—	282	0.32	4	5
Hornback	1974	2	—	—	1238	0.01	4	4
Hornback	1974	3	729	0.09	855	-0.03	5	4
Jackson, Bitacola, Janes, & Esses	2013	1	72	0.41	—	—	—	1
Jamelske, Barrett, & Boulter	2013	1	493	0.28	—	—	5	5
Joireman & Liu	2014	1	299	0.48	—	—	—	4
Jones & Dunlap (GSS 1973–90)	1992	1	—	—	1247	0.12	—	2
Jones & Dunlap (GSS 1973–90)	1992	2	1237	0.15	1237	0.08	—	2
Jones & Dunlap (GSS 1973–90)	1992	3	1267	0.15	1267	0.09	—	2
Jones & Dunlap (GSS 1973–90)	1992	4	1264	0.12	1264	0.03	—	2
Jones & Dunlap (GSS 1973–90)	1992	5	1302	0.19	1302	0.10	—	2
Jones & Dunlap (GSS 1973–90)	1992	6	1318	0.14	1318	0.09	—	2
Jones & Dunlap (GSS 1973–90)	1992	7	1247	0.22	1247	0.11	—	2
Jones & Dunlap (GSS 1973–90)	1992	8	1279	0.18	1279	0.07	—	2
Jones & Dunlap (GSS 1973–90)	1992	9	—	—	1357	0.13	—	2
Jones & Dunlap (GSS 1973–90)	1992	10	1269	0.10	1269	0.13	—	2
Jones & Dunlap (GSS 1973–90)	1992	11	1344	0.15	1344	0.12	—	2
Jones & Dunlap (GSS 1973–90)	1992	12	1266	0.12	1266	0.06	—	2
Jones & Dunlap (GSS 1973–90)	1992	13	1277	0.13	1277	0.11	—	2
Jones & Dunlap (GSS 1973–90)	1992	14	1282	0.11	1282	0.06	—	2
Jones & Dunlap (GSS 1973–90)	1992	15	1300	0.08	1300	0.06	—	2
Jones & Dunlap (GSS 1973–90)	1992	16	1170	0.12	1170	0.02	—	2
Jones, Fly, & Cordell	1999	1	842	0.18	—	—	—	1
Kamieniecki	1995	1	—	—	435	0.58	—	5
Kamieniecki	1995	2	—	—	99	0.53	—	5
Koenig	1975	1	—	—	322	0.15	—	5
Leonidou, Leonidou, & Kvasova	2010	1	500	0.41	—	—	—	1
Mazmanian & Sabatier	1981	1	30	0.57	30	0.21	—	5
McCright (Gallup 2001–08)	2010	1	4078	0.32	4078	0.37	5	5
Milfont	2007	2A	314	0.50	—	—	—	1

Table 2 (continued)

Author(s)	Year	Study/Dataset	Political ideology		Political affiliation		Education	Measure
			N	r	N	r		
Milfont	2007	2C	468	0.43	–	–	–	1
Milfont	2007	3A	201	0.38	–	–	–	1
Milfont	2007	3B	226	0.50	–	–	–	1
Milfont	2007	3C	257	0.45	–	–	–	1
Milfont, Harre, Sibley, & Duckitt	2012	1	269	0.15	269	0.22	–	4
Mohai & Twight	1987	1	6920	0.24	–	–	–	1
Page	1984	1	344	0.11	–	–	–	4
Peterson & Liu	2008	1	–	–	209	0.63	6	1
Rainey	2008	1	–	–	247	0.13	4	1
Ray	1980	1	200	0.06	–	–	–	5
Ray & Hall	1995	1	299	0.26	–	–	–	5
Ritchie	2004	1	439	0.27	–	–	5	1
Roberts	1996	1	533	0.39	–	–	5	1
Samdahl & Robertson	1989	1	2131	0.42	–	–	–	4
Schuldt & Roh	2014	2	192	0.39	–	–	5	1
Scott & Willits	1994	1	2582	0.14	–	–	–	1
Shanks	2006	1	–	–	58	0.27	6	1
Shaw	2011	1	–	–	270	0.22	7	1
Smith	2001	1	291	0.23	–	–	5	4
Springer, J. F. & Constantini	1974	1	450	0.17	722	0.06	–	3
Springer, L.	2013	1	265	0.56	–	–	5	1
Talberg & Howes	2010	1	–	–	24	0.80	–	5
Tognacci, Weigel, Wideen, & Vernon	1972	1	117	0.48	101	0.38	5	1
Tuckerman	2012	1	177	0.57	–	–	6	1
Van Hiel & Kossowska	2007	1	176	0.43	–	–	5	5
Van Hiel & Kossowska	2007	2	93	0.13	–	–	5	5
Van Hiel & Kossowska	2007	3	93	0.32	–	–	5	5
Van Liere & Dunlap	1981	1	806	0.24	–	–	–	1
Watson	2012	1	218	0.57	–	–	6	5
Woehr	2011	1	1893	0.36	1251	0.51	5	5
Wolkomir, Futreal, Woodrum, & Hoban	1997	1	1228	0.08	–	–	5	4

Note. GSS = General Social Survey (www.3.norc.org/GSS+Website). For education, the code represents the average education level of the sample (3 = completed primary or some high school, 4 = completed high school or tech/vocational school, no college, 5 = some college or Associate's, 6 = completed Bachelor's, 7 = some advanced study or advanced degree). For measure, the code represents the content of the environmental attitude scale used in the study (1 = general concern, 2 = economic, 3 = government action, 4 = a combination of 1–3, 5 = other).

significant at $p < 0.00001$, meaning the power to detect this effect in such a study would approach 1.00. In other words, almost all studies in this literature would be expected to find statistically significant effects in the expected direction (and, indeed, 71 of the 75 did so). Combined with the finding of a null relationship between sample size and effect size, these results suggest little evidence of publication bias in this set of studies (and the existence of very few findings against which reviewers or editors might be biased).

3.1.2. Corrections for other artifacts

As described in the methods section, it was possible to correct for error of measurement in the dependent variable as well as error of measurement and restriction in range in the independent variable in this analysis. The corrected correlation was $\rho' = 0.67$ ($SD_{\rho'} = 0.09$, 95% CI [0.58, 0.76]). The percentage of variance in effect sizes explained also improved to 90.51%.

Hunter and Schmidt (2004) suggest that for data sets in which at least 75% of the variance in effect sizes is explained by known and correctable artifacts, the remaining 25% is likely to be the result of unidentified artifacts. As a result, the finding that 90.72% of the variance was explained in this analysis suggests that the relationship between political ideology and environmental concern is not moderated by variables that have been examined in the existing literature. Instead, almost all variance in effect sizes can be attributed to error of measurement and restriction in range in the independent variable or error of measurement in the dependent variable. As a result, moderator analyses were not conducted for this variable.

3.2. Political party affiliation

A total of 63 effect sizes were extracted from the literature on party affiliation and environmental concern, from a total of 34 articles. The distribution of these effect sizes was positively skewed and mesokurtic.¹ The total sample size for these studies was $N = 58,621$, with a mean sample size of $N = 930.49$ ($SD = 719.27$). The distribution of sample sizes was also positively skewed, but leptokurtic. Almost all of the samples were taken from the U. S. population, although a small number were drawn from other countries ($n = 3$). There was little evidence that sample size was correlated with effect size ($r = -0.07$, $p = 0.58$) or with the year in which data were collected ($r = -0.05$, $p = 0.72$).

The articles from which effect sizes were obtained were published between 1970 and 2014, with data collected between 1967 and 2013. The numbers of both publications and data sets per decade were fairly consistent over that time period, with no specific decade emerging as a peak in research activity.

3.2.1. Bare-bones analysis

The results of the bare-bones analysis demonstrated that political party affiliation had a statistically significant positive relationship with environmental concern. The observed mean correlation was $r = 0.22$ (observed $SD = 0.17$), and the sample-size

¹ When examining the distribution of effect sizes, one study (Talberg & Howes, 2010) stood out as a possible outlier ($r = 0.80$). All results were identical regardless of whether or not this study was included, so it was retained in the final set of effect sizes.

weighted mean correlation was also $\rho = 0.22$ ($SD_{\rho} = 0.17$, 95% CI [0.17, 0.26]). Sampling error accounted for only 3.37% of the variance in effect sizes, suggesting that other artifacts or moderators were responsible for substantial variance in the obtained correlations.

It is again worth noting that in a study conducted with a sample of 930 people (the average sample in this set of studies), the observed mean correlation of $r = 0.22$ would be statistically significant at $p < 0.00001$, meaning the power to detect this effect in such a study would approach 1.00. In other words, almost all studies in this literature, just as in the political ideology literature, would be expected to find statistically significant effects in the expected direction (and, indeed, 54 of the 63 did so). Combined with the finding of a null relationship between sample size and effect size, these results suggest little evidence of publication bias in this set of studies.

3.2.2. Corrections for other artifacts

As described previously, it was possible to correct for both error of measurement in the dependent variable and restriction in range in the independent variable in this analysis. The corrected correlation was $\rho' = 0.30$ ($SD_{\rho'} = 0.20$, 95% CI [0.24, 0.35]). Notably, this confidence interval does not overlap with the confidence interval for the relationship between political ideology and environmental concern, suggesting that the relationship with political affiliation is indeed weaker. The percentage of variance in effect sizes explained also increased to 22.10%, but still fell well short of the 75% cutoff suggested by Hunter and Schmidt (2004). Moderator analyses were conducted to attempt to explain the remaining variance.

3.2.3. Moderator analyses

Three moderators were examined for these data: data collection year, content of the environmental concern measure, and mean sample education level.

3.2.3.1. Data collection year. A preliminary examination of the correlation between effect size and year suggested that effect sizes tended to get larger over time ($r = 0.53$, $p < 0.001$). To supplement this finding, the moderating effect of year was examined further. Specifically, the studies were split into two groups, one with data sets from 1990 or earlier (the midpoint of the data collection years; $n = 35$), and one with data sets from 1991 or later ($n = 28$). As expected, studies in later years ($\rho' = 0.44$, 95% CI [0.39, 0.48]) produced much larger effect sizes than studies in earlier years ($\rho' = 0.18$, 95% CI [0.11, 0.25]). In addition, for studies conducted on data collected in 1991 or later, 100% of the variance in effect sizes was attributable to artifacts, suggesting that there were no additional moderators among these studies. Conversely, for studies conducted on data collected in or before 1990, only 8.61% of the variance in effect sizes was attributable to artifacts. To attempt to explain additional variance, further moderator analyses were conducted on these 35 studies.

3.2.3.2. Measure content. To examine the impact of the environmental concern measure, comparisons were made between studies using general attitude measures ($n = 5$), economic or government action-related measures ($n = 21$), or some other measure ($n = 9$), such as support for environmentalism or perceptions of industry.

Contrary to expectations, there was insufficient evidence to conclude that the measure of environmental concern further moderated the relationship between political affiliation and environmental concern. General measures ($\rho' = 0.10$, 95% CI [-0.05, 0.25]) and economic or government action measures ($\rho' = 0.16$, 95% CI [0.08, 0.24]) tended to produce somewhat weaker effect sizes than other measures ($\rho' = 0.31$, 95% CI [0.14, 0.47]), but these

differences were not statistically significant. Moreover, splitting the effect sizes up by measure explained very little additional variance, with total variance in effect sizes explained increasing to only 9.05–11.93% in each condition.

3.2.3.3. Education. Among the 35 studies conducted in 1990 or before, only eight studies reported enough information to code the average education of the sample. Three of the studies had samples with an average education of high school or less (3 or 4); the other five had an average of some college or more (5–7). With so little information available, it was not possible to conduct moderator analyses with high confidence. However, among these eight studies, effect size and sample education level were strongly correlated ($r = 0.53$, $p = 0.18$). Although this effect did not reach conventional levels of statistical significance, this finding suggests that education may be a potential moderator of the relationship between political affiliation and concern among studies conducted in 1990 or earlier.

4. General discussion

The purpose of this study was to examine the relationships of political party affiliation and political ideology with environmental concern. The results of two meta-analyses suggest that both political variables have substantial positive associations with concern, although the relationship with political ideology is stronger. Moreover, the relationship with political ideology is unmoderated, whereas the relationship with political affiliation is moderated by the year in which data were collected and may also be moderated by the educational level of the sample. Studies conducted after 1990 tended to produce stronger effect sizes for political affiliation than earlier studies, and early studies on more educated samples tended to produce stronger effect sizes than early studies on less educated samples.

These findings have several important implications for ongoing arguments in the field. First, although these results are consistent with previous claims that political ideology has a stronger relationship with environmental concern than party affiliation, they are inconsistent with arguments such as Buttel and Flinn's (1978, p. 30)—that “there is no major relationship between party preference and environmental concern.” Party affiliation may have a weaker relationship with environmental concern, but the association is still a substantial and statistically significant one. Furthermore, the finding that the relationship with political affiliation was moderated by several variables, but the relationship with political ideology was not, suggests that there are key differences between the two (i.e., they differ not just quantitatively, but qualitatively). In the future, scholars would benefit from attending to both party affiliation and ideology in studies of environmental concern.

Second, these results are partially consistent with findings from primary studies (e.g., Buttel & Flinn, 1978; McCright & Dunlap, 2011) that education is a moderator of the relationship between political variables and environmental concern. This conjecture was not supported for political ideology, but there was tentative evidence to suggest that, at least for studies conducted in 1990 or earlier, the relationship between party affiliation and environmental concern was stronger among populations with a mean education level of some college or more than among populations with only a high school education or less. However, interpretation of this moderating effect is also complicated by the finding that the relationship between political affiliation and environmental concern was *unmoderated* for studies conducted in 1991 or later. In other words, these results suggest that any moderating effect of education has disappeared over time. It is unclear why this moderating effect appears to have disappeared; additional studies

of the relationships between education, political affiliation, and environmental concern may be helpful in illuminating this finding further in the future.

Third, these findings are inconsistent with arguments that the method of measuring environmental concern makes a substantive difference in the results (Klineberg et al., 1998; Van Liere & Dunlap, 1981). Although different scales were found to vary widely in their reliabilities, the measure of environmental concern did not otherwise moderate the relationship of either political party or ideology with environmental concern. In other words, “it does make a difference how it’s measured” (Klineberg et al., 1998, p. 734) only insofar as the scales differ in quality. However, the lack of evidence for the moderating effect of measure does not mean that environmental scholars can neglect measurement; conversely, these meta-analyses suggest that serious energy should be devoted to ensuring that valid and reliable measures are employed in studies of environmental attitudes. Poor measurement introduced substantial artifactual variance into this set of effect sizes, obscuring the true effect size and perhaps leading authors to the false conclusion that additional moderators might exist.

Finally, these results suggest that partisan sorting (Levendusky, 2009) has occurred on the topic of environmental concern, but do not provide strong evidence for issue polarization. Specifically, the analyses demonstrated that the relationship between environmental concern and political party has strengthened over time, whereas the relationship with political ideology has remained the same. In other words, these results suggest that the “widening gap” (Dunlap & McCright, 2008, p. 27) between Republicans and Democrats on environmental issues appears to be a result not of attitude change, but of a change in voting patterns. Although this finding does not rule out the possibility that some issue polarization has occurred as well, it does suggest that partisan sorting has had a stronger influence on this particular issue. In some ways this finding is encouraging—if individual voters’ attitudes have not diverged much over the past several decades, then disagreements on issues such as climate change may be less insurmountable than recent polls seem to suggest. However, this partisan sorting may still present substantial difficulties when it comes to matters of public policy. As pro-environmental views become more tightly associated with the Democratic Party, Republicans are likely to respond with greater bias, activism, and anger (Mason, 2014). In sum, even if polarization has not occurred, studies such as Kidwell, Farmer, and Hardesty (2013) and Haggard et al. (2014), which attempt to uncover environmental messages that will appeal to both Democrats and Republicans, will become increasingly important in the future.

Although the results of this study are encouraging, there are a few important limitations. For one, there are some statistical artifacts that could not be assessed in this analysis. In particular, the reliability of the one-item political affiliation measures could not be estimated. One-item measures generally have low reliability, perhaps as low as $\alpha = 0.25$ (Hunter & Schmidt, 2004), which would result in substantial attenuation of the correlation between political affiliation and environmental concern. As a result, even the corrected estimate of the effect size probably underestimates the true effect size.

In addition, there may be other moderators that could not be accounted for in the present analysis. For example, Guth et al. (1993, 1995), who employed samples of clergy and religious activists, tended to obtain large effect sizes ($r_s = 0.38 - 0.65$). It may be that religiosity is an underexplored moderator of the relationship between party ideology or political affiliation and environmental concern. In addition, primary studies using samples of political elites tended to find particularly large effect sizes, including Kamieniecki’s (1995) study of the U. S. Congress ($r_s = 0.58$ and 0.53)

and Talberg and Howes’s (2010) study of the Australian Parliament ($r = 0.80$). As Converse (1964) suggested, proximity to the political elite, like education, may be expected to produce better integrated political beliefs, and thus larger effect sizes. In the future, it would be beneficial for additional primary studies and meta-analyses to examine these possible moderators in greater depth.

Overall, this study provides an important synthesis of the studies available on the relationships of political ideology and political affiliation with environmental concern. The findings that both variables had substantial associations with concern; that the political affiliation relationship was moderated by year and possibly by education level; and that the political ideology relationship was unmoderated by coded variables clarify some of the existing arguments in this literature. Along with the finding that partisan sorting, but not issue polarization, has occurred on this issue, these results indicate important considerations for authors conducting future work in this area.

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