How much of your politics is influenced by genetics? How much of your politics is influenced by your DNA? How do genes ‘build’ social and political attitudes? What are the mechanisms that mediate this pathway from DNA to voting booth?

One does not have to look very hard to observe that people differ greatly in their social and political attitudes. Views on religion, gun control, free markets, and political parties can divide rooms. From where do these differences in opinion emerge? And what do genes and biology have to do with this apparently most social of questions?

This essay describes a growing body of work suggesting that our biological makeup influences our social and political attitudes and explores the methods that underpin such claims. The authors argue that the conclusions from this work are increasingly clear: understanding political divides will require biology as well as social explanations.

For the longest time, we viewed our attitudes and values as being the result of choices we make. This may be true, but researchers are now starting to change their views. Several studies have shown that our social and political attitudes and values can have very real effects on social cohesion and on how we perceive events. Some of the key findings from these studies are:

- Our social and political attitudes can affect our mental and physical health.
- Our social and political attitudes can influence our decisions and actions.
- Our social and political attitudes can affect the way we interact with others.

In this article, we introduce this behaviour genetic approach for understanding the origins of social attitudes and values. By using twin and family designs, researchers can estimate the relative contributions of genetic and environmental factors to these traits. Twin studies have shown that genetic factors contribute to the development of political attitudes and values. For example, identical twins are more similar in their political attitudes than fraternal twins. This is true even when the twins are reared in different environments. This suggests that genetic factors play a role in the development of political attitudes and values.

A number of studies have suggested that genetic factors may be involved in the development of political attitudes and values. For example, a study by Eaves and Eysenck (1974) found that political attitudes were more similar in identical twins than in fraternal twins. This suggests that genetic factors may be involved in the development of political attitudes and values.

In this article, we discuss the methods that underpin this approach and the findings that have been made. We also discuss the challenges that remain in understanding the role of genetics in the development of political attitudes and values.

The earliest genetically informative study of socio-political attitudes was conducted by Eaves and Eysenck (1974), who found that self-reported liberal-conservatism was the critical issue concerns whether these more similar treatments cause changes in the measures of interest to the researcher. As such, while maternal boldness may be correlated with antisocial traits in the offspring, the aetiology of this association cannot be explained without a role for genetic factors. As such, this is a conclusion that can successfully distinguish genetic and environmental influences.

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range of social and political issues, including gay rights, the death penalty and abortion. These findings too, however, largely failed to enter mainstream consideration of these results until being revisited in 2005 by political scientist John Martin et al. (2008) and political scientist John Martin et al. (2009) found that genetic effects on political attitudes emerge strongly only after children have typically left the family home, with MF twins converging and DZ twins diverging in similarity around young adulthood (>20 years of age). And Fowler et al. (2008) observed that the decision to vote at all (voter turnout) is substantially heritable; indeed, more so than party choice or political attitudes.

Religion

Perhaps the most surprising result to emerge from genetic research into social and political attitudes has been the finding of heritable effects underlying religious beliefs. In an early study, Martin et al. (1986) examined religious attitudes such as observance of the Sabbath, authority of the Church, and truthfulness of the Bible. They found significant shared-environment influences (environmental influences that make children in the same family more similar to one another), but also significant genetic effects. Waller et al. (1990) subsequently confirmed these findings showing that religious attitudes and interests contain significant genetic influences. Provocative even 20 years later (e.g. Lewis & Bates, 2010), most of the studies examining religious beliefs and attitudes in the literature are limited to twin studies, and it is unclear to what extent these results can be extended to the general population. The authors concluded that it was not time to discard the a priori assumption that individual differences in religious and other social attitudes are solely influenced by environmental factors (p.141). Recently, we ourselves examined the heritable basis of religiosity (Lewis & Bates, 2012b). We again found that religiosity was heritable, but perhaps more interesting was the observation that these heritable influences on religiosity were completely accounted for by genetic influences on traits with no intrinsic religious component; namely, basic temperament concerning community integration and existential certainty.

In-group favouritism

Unlike politics and religion, the genetic basis of in-group favouritism and prejudice had not been studied at all until relatively recently. Work from our own group demonstrated that in-group favouritism and prejudice also contains a substantial heritable component (Lewis & Bates, 2010). In this study, we examined the claim that race favouritism (i.e. preferences for members of one’s own racial group) is simply one manifestation of a more general ‘us vs. them’ communalism. This claim is based on reasoning that limited exposure to other racial groups over evolutionary time necessarily must have limited any ability of natural selection to shape the human mind towards specific race preferences (Kurzban et al., 2001). Our study found support for a common, and strongly heritable, favouritism system – reflecting in-group bias in the realm of religion, ethnicity and race. Interestingly, however, we also found significant genetic effects for each of these forms of favouritism in other ways, even when one accounts for the common favouritism system, additional genetic factors appear to influence race favouritism. The overarching sentiments emerging from these genetic studies of attitudes and preferences are highly complex. Firstly, genetic influences are evident on a range of social and political traits and behaviours, an observation that sits in contrast to common assumptions in social sciences, although one that should not be ignored if we are to fully unravel the origins of social attitudes. Secondly, genetic architectures of social attitudes are likely to be both complex and multifaceted, as evidenced, for example, by the multiple heritable influences underlying in-group favouritism (Lewis & Bates, 2010).

Unmasking genetics: Potential for molecular studies?

While twin studies and correlational studies as to the presence of genetic influences, they of course cannot identify specific alleles that are at work. So if social and political sentiment contains an underlying heritable basis, what is the likelihood of generating the DNA evidence to influence such attitudes? At the time of writing, there had been relatively few molecular genetic studies of social and political attitudes have been reported (e.g. Lewis & Bates, 2010). One early study identified two alleles (in genes coding for monoamine oxidase and serotonin) to variant participation (Fowler & Dawes, 2008), while a dopamine receptor gene has been associated with variation in partisan attachment (Fowler & Dawes, 2009). Additionally, a recent study addressing gene–environment interaction reported that the number of friends in adolescence was significantly associated with liberal political attitudes, but only for those who possessed the 7R variant of the dopamine receptor gene (Wray & Visscher, 2010). The authors argued that individuals high in sensation-seeking – behaviour commonly linked with the dopaminergic system (Cloninger et al., 1993) – are more likely to have desires for novelty, while also to some extent, maps to a liberal view of the world (McCrue, 1985). Moreover, of such individuals, those who possess a wider social network are suggested to be more likely to adopt liberal attitudes as a function of being exposed to broader socio-political discourses, thus generating the observed association.

While these early results are encouraging and certainly provide promise for future research programmes, it is worth noting that molecular studies of these kinds is largely in its infancy, so encouraging results have been reported in recent years, including linkage and functional imaging associations with social and political attitudes. Amoedo et al. (2007) reported an association between political conservatism and differential gene expression during a Go/No-Go task using event-related potentials. The GoNo-go task requires participants to make a response (‘go’), or to withhold a response (‘no-go’), to specific stimuli, with go trials typically occurring with higher frequency than the irregular no-go trials, while a dopamine receptor gene has been associated with variation in partisan attachment (Fowler & Dawes, 2008). These findings too, however, failed to enter mainstream consideration of these results until being revisited in 2005 by political scientist John Martin et al. (2008) and political scientist John Martin et al. (2009) found that genetic effects on political attitudes emerge strongly only after children have typically left the family home, with MF twins converging and DZ twins diverging in similarity around young adulthood (>20 years of age). And Fowler et al. (2008) observed that the decision to vote at all (voter turnout) is substantially heritable; indeed, more so than party choice or political attitudes.

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genes and beliefs

(2012) found that moral concerns with (1) limiting harm to others and maximising fairness, and (2) authority deference, group loyalty, and purity/sanctity were associated with grey matter volume in dorsomedial prefrontal cortex and subcallosal gyrus, respectively. While subcallosal gyrus had not been implicated in social attitudes previously, dorsomedial prefrontal cortex is a major hub facilitating social cognition and mentatining (Amadio de Frith, 2008), thus supporting links between this region and concerns over others well-being. Taken together, these findings begin to lay the foundations for detailed understandings of how genetic factors modulate neurobiology, and in turn generate individual differences in social attitudes. What is not yet understood, however, is whether these brain regions are linked to social attitudes via genetic pathways or environmentally influenced pathways. We are only at the very beginning of the quest to answer such questions, however, social psychological work combining the powerful methods of genetics with cognitive neuroscience techniques (e.g. Toga & Thompson, 2005) may lead to powerful insights into the biological mechanisms that underpin social attitudes.

Mutability of genetic effects

One of the perennial concerns levelled at work purporting to find a genetic basis to traits of central interest to human existence, as social and political attitudes clearly are, is that they suggest determinism and immutable effects. While this criticism is itself often rather ideologically predictable (i.e. criticisms seem directed more frequently when the findings appear to conflict with values), it is certainly true that such immutability, at least in the case of social attitudes, seems to be quite the opposite of what we see around us much of the time: as Winston Churchill noted, ‘If you’re not a liberal at twenty you have no heart, if you’re not a conservative at forty you have no brain’, alluding to the notion that context plays an important role in the expression of political attitudes.

Leaving aside the political wrangling, what is clear here is that political affiliations do change, and sometimes markedly. How can genetic studies account for such observations? One answer to this question is that genetic influences on social and political attitudes are unlikely to reflect mechanisms designed to output focal behaviours such as joining specific political parties (e.g. Labour or Conservative), or believing in a specific divine figure: indeed, twin studies show that while strength of religious belief is heritable, the actual denomination one ascribes to is almost entirely attributable to environmental influences (D’Onofrio et al., 1999). Rather, it is more probable that these underlying genetic influences serve to shape somewhat less focal social behaviours, such as general concerns for norm adherence. In support of this notion, interesting recent work by Duckitt and Sibley (2010) suggests prejudice, at least in part, may reflect increased concerns over violations of social norms: out-groups who are perceived as breaking local norms are typically most disliked. We recently tested this hypothesis using a twin sample and found that genetic factors influencing prejudice were substantially overlapping with measures of traditionalism and right-wing authoritarianism (Lewis & Bates, 2012a), both of which are measures reflecting concerns for norm maintenance. It is plausible, then, that mean levels of prejudice are moderated by environmental factors – such as realistic challenges to social norms – but that individual responses to these challenges reflect underlying heritable sensitivities to norm violations.

Final words

We hope this brief journey through the emerging and exciting work applying behaviour genetic methods to the study of social and political attitudes will leave the reader thinking about three key pieces of information.

Firstly, individual differences in social attitudes, in part, appear to contain an underlying genetic basis (in keeping with what is known for a range of other psychological traits). Therefore, any attempt to foster understandings of the socio-political mind will be impoverished without the involvement of a genetically informed approach to such explorations.

Secondly, while genomic technologies have advanced enormously in recent years, we are still a long way from understanding the precise genetic markers that give rise to these heritable individual differences. In fact, it is possible that we may never possess sufficient sample sizes to reliably map the location of these genetic influences, and that the effects we do uncover may be of (extremely) modest size.

Thirdly, while the evidence for genetic influences underlying social attitudes is growing, it is still far from clear what the psychological mechanisms are which mediate these genetic effects on social traits such as political conservatism, religiosity and prejudice; however, this literature is developing rapidly at the time of writing and substantial insights may not be far away.

In summary, we are looking at a bright new approach to social and political psychology, albeit one with many challenges ahead. We are excited to see how the field matures in years to come and what insights into the origins of social attitudes will be gleaned from future research. The new approach challenges existing theories, but creates a revolutionary moment for researchers to provide mechanisms explaining human social behaviour at a deeper level than previously explored.