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Critical response to Archer et al. (2015) “Science Capital”: A Conceptual, Methodological, and Empirical Argument for Extending Bourdieusian Notions of Capital Beyond the Arts

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Introduction

Archer et al. (2015) propose contributing to science education theory by introducing the concept of ‘science capital’ to supplement influential French sociologist Pierre Bourdieu’s theory. We agree with Archer et al. (2015) that there is considerable potential for more broadly applying Bourdieu’s conceptual apparatus – as indeed he himself applies to education (Bourdieu, 1986), politics (Bourdieu, 1996) and academic life (Bourdieu, 1988). We commend the authors for attending to the role of social inequality in science education and using Bourdieu’s theoretical framework as their primary inspiration. This focus is much needed in the field of science education research, which has too often neglected social class as a variable (e.g. Dawson & Jensen, 2011). The present essay briefly reviews Archer et al.’s arguments, highlighting under-developed elements of their analysis.

We contend that adding ‘science capital’ to Bourdieu’s existing range of concepts is unnecessary. There is just as good an argument for ‘sports capital’, ‘numeracy capital’ and many other domain-specific ‘capitals’ as for ‘science capital’. Yet these domain-specific forms of capital do not add anything beyond saying ‘cultural capital in sports’ or ‘in science education’. Our main concern is that introducing ‘science capital’ may undermine a focus on the ways in which inequalities and injustice in science education are coterminous with other forms of systemic inequality. As such, this is not merely a pedantic dispute about terminology. Bourdieu’s term cultural capital communicates a cross-domain pattern of non-economic resources, which are deployed to distinguish between people and exclude individuals and groups. Indeed, the enduring power of Bourdieu’s focus on cultural consumption in *Distinction* is its revelation of hidden mechanisms of exclusion and division. That these exclusionary processes operate across arts, sports (Stempel, 2005), reading habits (Wright, 2006), etc., and not just in one domain such as science, is important. It reveals a systemic pattern throughout society reproducing deeply unequal, unjust and exclusionary social relations, even when financial barriers to cultural participation appear to have been addressed (for example, through free entry to museums and galleries). There are also similarities in patterns of exclusion in cultural participation and science engagement activities, including overlap between consumers of arts and culture experiences more generally and those who attend science museums and events (e.g. Jensen, 2014). A separate concept of ‘science capital’ could detract from elaborating on the implications of these similarities.

Is 'science capital' distinct from 'cultural capital'?

We strongly agree with Archer et al.'s (2015: 5) suggestion that science-related resources can be considered important contemporary forms of capital that contribute to the production of social relations of advantage and disadvantage (Archer et al., 2015: 5). However, nothing in Bourdieu's account of cultural capital excludes scientific aspects of culture. Moreover, we should be cautious about adding to the volume of forms of capital, varieties of which have permissively expanded in social scientific discussion (Fine, 2001, 2010). The proliferation of such labels risks obscuring the similar underpinnings of cultural exclusion in artistic, scientific and other domains. Bourdieu's insistence on the inter-relation between his concepts of capital, habitus and field implies specific theoretical and political commitments which need to be carefully considered in any re-working or reclaiming of them. As such, the key question when positing a new form of capital like this is whether it illuminates more than it obscures.

We contend that the phenomena described by Archer et al. (2015) should remain within the bounds of cultural capital, given that science and other forms of legitimate culture occupy similar social space (e.g. Jensen 2014) and have very similar consequences. Bourdieu (1986) contended that cultural capital exists in three main forms: institutionalized, such as through educational qualifications; embodied, for example in accent or the management and comportment of the body; and objectified through the reproduction of cultural goods and artefacts. This formulation, which Archer et al. draw on, does not preclude consideration of science. For example, in *Distinction* (1984), where Bourdieu's focus on arts consumption is most thoroughly elaborated, the discipline or subject matter of educational qualifications was not considered in the quantitative analyses. It was the possession of a degree or *licence per se*, not whether it was in a science or arts/humanities topic, which was found to relate to high volumes of cultural capital. This then was used as part of the explanation for the distribution of tastes and practices in 1960s France. As Bennett et al. point out, in early 21st century Britain, a higher proportion of people in higher occupational classes studied science or engineering degrees than studied degrees in the arts and humanities (Bennett et al., 2009: 148). Science, then, is already part of the institutionalized form of cultural capital. That is, science remains implicated in the distinctions between the dominant and dominated fractions of the dominant class, alongside cultural capital developed from other domains more extensively elaborated by Bourdieu such as the arts.

Archer et al. (2015: 7) indicate that science capital refers to a way of organizing various types of economic, social and cultural capital specifically relating to science. Scrutiny of this definition raises questions about the proposed concept's value. If 'science capital' includes economic capital, then saying that it is unequally distributed according to economic background/capital is tautological. Archer et al.'s own quantitative analysis indicates that science capital, as they have measured it, aligns closely with non-science cultural capital (Archer et al., 2015: 15). They indicate that students with very low cultural capital are proportionally overrepresented among students with low science capital, whilst students with a very high cultural capital are proportionally overrepresented among students with high science capital (Archer et al., 2015: 15). This result suggests that there is little empirical difference between science and cultural capital. Indeed, an alternative way of reading Archer et al.'s (2015) research initiative is as a test of whether science capital is a distinctive form of

capital (apart from non-science cultural capital). Their own results suggest that science capital is *not* distinct from cultural capital.

Locating, defining and measuring science capital and cultural capital

Archer et al. (2015) argue that “targeting interventions at science capital has the potential to generate use or exchange value for individuals or groups to support and enhance their attainment, engagement and/or participation in *science*” (emphasis added; Archer et al., 2015: 7). They also view ‘science capital’ as a way to understand the reproduction of inequalities in science participation and to dismantle and re-structure current unequal relations of power (Archer et al., 2015: 22). While these are reasonable positions, they under-theorize the role of the field in relation to capital in Bourdieu’s model. Capital is not simply accrued. Its value is also *struggled* over by social agents and institutions with various, often competing, interests in maintaining the shape of the field and their positions in it. Although in their summary of Bourdieu’s approach they acknowledge the significance of the field in understanding the role of capital in all its forms, it is unclear in Archer et al.’s exposition of how the field affects the struggle over science capital, or how the field is shaped by the dispersion of such capital.

Methodologically, Archer et al.’s (2015) construction of a composite ‘score’ for science capital based on respondents’ agreement with positive views about science, science media consumption and a variety of other indicators. This method uses psychometric methods, inferring the existence of an underlying construct (*viz.*, science capital) based on correlations between items, rather than validity testing. The approach of aggregating scores on a variety of indicators of pro-science attitudes, aspirations, behaviours and characteristics to comprise a science capital score differs significantly from Bourdieu’s (1984) methods for identifying capital. Bourdieu, as part of the reflexive critique of his own methods (1984: 318) noted the role of ‘cultural goodwill’ in the ‘legitimacy imposing situation’ of survey data collection. In this situation, survey participants tend to anticipate the interviewer’s motives and tell them what they think they want to hear. This well-established risk of bias in survey research methodology seems likely to be accentuated in the context of children responding to adult questions about something as discursively mysterious and powerful as ‘science’ (also see Jensen 2014b).

Substantively, such an approach also risks reifying ‘science’ and scientific institutions as they currently *are* (i.e. exclusionary along gender, class and ethnic lines). While these institutions are left unchallenged, uneven levels of assistance are offered to excluded individuals to help them appreciate science and to change themselves to become more acceptable to these reified institutions. Indeed, applying Bourdieu’s model in a more whole-hearted manner would highlight that scientific institutions are also powerful players with particular interests in preserving and policing the distribution of capital within the field. Indeed, by downplaying these aspects of Bourdieu’s model, Archer et al.’s (2015) project risks, paradoxically, further reinforcing current power relations and unequal structures.

There is a gap, therefore, between Archer et al.’s progressive rhetoric about changing power relations and their specific solutions, which focus on building science capital through encouraging children to express more positive views about science, consume more pro-science media, etc. Archer et al.’s proposed solutions (2015) imply that because

cultural/science capital is unequally distributed along ethnic and class lines, we need to get the people at ‘the bottom end’ to pull themselves up with better attitudes and aspirations towards science. This type of solution aligns with the ‘human capital’ theorists (e.g. Becker 1964) that Bourdieu constructed his work against. We would argue that this is the wrong prescription for the problem of systematic exclusion in science. A normative proposal more in keeping with the Bourdieusian project would target injustice in the distribution of educational opportunity, while exploring how ‘legitimate’ forms of knowledge and authority are constructed and policed by the institutions invested in the preservation of their own position in the field.

Conclusion

We have argued that Archer et al.’s push towards ‘science capital’ as distinct from cultural capital heads in the wrong direction. Rather than focusing narrowly on science as a special case, we need to zoom out and pan the camera side to side in order to see how science is just one element of a larger unjust socio-cultural system. Bourdieu’s conceptual toolkit has much to offer in this context because the constituent parts of this unjust system are closely tied to the distribution of cultural capital. The solutions, however, do not involve increasing reverence for science and its institutions as they are currently constituted. Instead we must pay attention to and challenge their role in the legitimation and distribution of forms of capital within the field in which they operate. This enables a much clearer view of the relations between a field such as science and the overarching role of economic and political power structures that circumscribe educational options and life choices.

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