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Intelligence



Sick? Or slow? On the origins of intelligence as a psychological object



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ARTICLE INFO

Article history:

Received 8 May 2013

Received in revised form 11 July 2013

Accepted 6 August 2013

Available online 4 October 2013

Keywords:

Binet (Alfred)

Mental testing

History

Binet–Simon scale

Education

ABSTRACT

This paper examines the first moments of the emergence of “psychometrics” as a discipline, using a history of the Binet–Simon test (precursor to the Stanford–Binet) to engage the question of how intelligence became a “psychological object.” To begin to answer this, we used a previously-unexamined set of French texts to highlight the negotiations and collaborations that led Alfred Binet (1857–1911) to identify “mental testing” as a research area worth pursuing. This included a long-standing rivalry with Désiré-Magloire Bourneville (1840–1909), who argued for decades that *psychiatrists* ought to be the professional arbiters of which children would be removed from the standard curriculum and referred to special education classes *in asylums*. In contrast, Binet sought to keep children *in schools* and conceived of a way for *psychologists* to do this. Supported by the *Société libre de l'étude psychologique de l'enfant* [Free society for the psychological study of the child], and by a number of collaborators and friends, he thus undertook to create a “metric” scale of intelligence—and the associated testing apparatus—to legitimize the role of *psychologists* in a to-that-point *psychiatric* domain: identifying and treating “the abnormal”. The result was a change in the earlier law requiring all healthy French children to attend school, between the ages of 6 and 13, to recognize instead that otherwise normal children sometimes need special help: they are “slow” (*arriéré*), but not “sick.” This conceptualization of intelligence was then carried forward, through the test's influence on Lewis Terman (1877–1956) and Lightner Witmer (1867–1956), to shape virtually all subsequent thinking about intelligence testing and its role in society.

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Contents

1. Introduction	700
2. Before the government commission	701
2.1. Opposition between psychology and psychiatry: Binet vs. Bourneville	701
2.2. Free society for the psychological study of the child (1899–1904)	702
2.3. Differential diagnosis of the abnormal in 1904	702

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3.	Recognizing a loophole in the law regarding universal education	703
3.1.	Creation of a ministerial commission (October 1904)	703
3.2.	Binet proposed a complete program for abnormal children (November 1904)	703
3.3.	Binet at the ministerial commission (December 1904–April 1905)	704
4.	Constructing the test	704
4.1.	Binet & Simon's presentation at the International Congress in Rome (April 1905)	704
4.2.	First version of the metric scale of intelligence (July 1905)	706
4.3.	The contribution to knowledge	707
4.4.	Work in schools coincided with the construction of the tool	707
5.	Conclusion: Binet's contributions to "psychological science in the public interest"	708
5.1.	Changing the law	708
5.2.	Final thoughts	708
	References	709

"If we really want to help the intellectually disabled, the best thing we can do is complete the task begun by... Binet... and countless others of understanding exactly what general intelligence is." —D. K. Detterman (2010)

1. Introduction

The French psychologist Alfred Binet (1857–1911) is accepted today as the inventor of the first working test of intelligence. How this was accomplished has been widely discussed (see esp. Fancher, 1985; Foschi & Cicciola, 2006; Wolf, 1964, 1969a, 1969b; also Wolf, 1973, for a biography).¹ And thus, for example, it is generally accepted that Binet developed his test following the introduction of a law regarding compulsory universal education in France and his subsequent appointment to a government commission for the study and schooling of children afflicted by what we now call—as a result of his influence—"developmental delay". These historical works have been invaluable, in terms of situating our contemporary understanding of intelligence testing, but none have explained how intelligence *itself* came to be conceived-of as a *psychological object* (following Danziger, 2003). Indeed, given the emergence and spread of testing during the Progressive Era of social reform, it could easily have become *psychiatric* (see e.g., Burnham, 1960). Thus, a question remains: How did intellectually "abnormal" children become *slow* rather than *sick*? (How, in other words, was our present task set?)

To begin to address this question, we returned to the source: the broader context in which the original Binet test was constructed, in an attempt to capture some of the several French influences omitted from the secondary English-language literature (cf. Nicolas & Andrieu, 2005; Vial, 1990). As a result, the present article offers a new perspective—relying on the primary French-language texts from that period—and proposes that Binet created his intelligence test *with the explicit intent of legitimizing the role of psychologists in schools, while*

*simultaneously limiting the role of psychiatrists and their power to remove students from school.*² In doing so, Binet also thereby fired an early shot in what has since become a war of words regarding which profession ought to have dominion over the mind (see, in this connection, e.g., Herman, 1995; Lunbeck, 1994; Scull, 2010, 2011a, 2011b, 2011c).

The result here is not a biography in the usual sense, because what follows is not strictly speaking about Binet *as an individual* (following Ball, 2012). It is rather an examination of the collaborations and negotiations that collectively produced a material object: the Binet–Simon test of intelligence, which was then imported into American psychology—having been separated from its context of discovery—by Henry Goddard (1866–1957) and Lewis Terman (1877–1956). What we present here is therefore closer, as a result, to a "biography of a scientific object" (following Daston, 2000; cf. Burman, 2012).

In what follows, we trace three interconnected stories: Binet's interactions with psychiatry on behalf of psychologists, the justification for the government commission and what followed from its activities, and the collaborations that produced the test that came to be so influential. Aside for some brief comments in conclusion, however, we do not discuss the American indigenization of the test itself because this has been ably done elsewhere (see e.g., Carson, 2007; Castles, 2012; Chapman, 1988; DuBois, 1970; Gould, 1981, 1995; Minton, 1988; Zenderland, 1998).

The aims of this paper are thus: To (a) furnish a more detailed background in order to highlight the challenges navigated in producing the kind of test we all now take for granted, which had to that point not yet been invented and which has since come to be so influential that the resulting perspective seems now to have been inevitable. To (b) show that Binet built an original instrument to measure mental "retardation" scientifically because he wished to limit the role of psychiatrists—who used subjective measures (with little agreement regarding the definitions of categories with

¹ On Wolf, see McPherson and Popplestone (2000).

² For related discussions covering other aspects of Binet's career, see Fancher (1988), Nicolas (1994, 1997, 2011), Nicolas, Gounden, and Sanitioso (2011), Nicolas, Gras, and Ségui (2011), Nicolas and Levine (2012), Nicolas and Sanitioso (2012), Nicolas, Segui, and Ferrand (2000a, 2000b). For a full bibliography of his complete works, many entries of which include links to open-access full-text, see Andrieu and Nicolas (2012).



Fig. 1. Binet's view of a "normal" childhood, reproduced from a full-color illustration included in the test packet associated with his first metric scale of intelligence (Binet & Simon, 1905c, p. 205). Here, for example, we see that Mother is in the kitchen with her three children and the family pet: *imbéciles* would be expected to be able to identify and name all of the objects shown, when prompted, but *idiots* would not.

epistemologically violent consequences)³—specifically in making the important decision about whether a physically healthy but apparently “abnormal” child ought to be excluded from the standard curriculum presented at “normal” schools. And to (c) more deeply contextualize contemporary discussions regarding the role of intelligence testing, especially in the assessment of children's suitability for mainstream schools and the special education programs that now exist within them. The consequence of this, because we are engaging explicitly with the Anglo-American understanding of Binet's contributions, is that we are also purposefully contributing to the emerging body of literature advocating for the internationalization of Psychology as a discipline (following Arnett, 2008; see also Baker, 2012; Leong, Pickren, Leach, & Marsella, 2012).⁴

2. Before the government commission

Equality in matters related to the citizenry's access to knowledge was a cornerstone of the French Third Republic (1870–1940). Indeed, this ideal—as it would come to affect children—was officially signed into law on 28 March 1882: “primary education is compulsory for all children, of both sexes, from the age of 6 years until 13 years” (our trans of Article 4; see also Prost, 1968). Blind and deaf children were specifically recognized, and excluded, but all other children were deemed equal under the law: if the child was healthy, then the child would be going to school.

The present general understanding attributes to Binet the recognition, following the passage of this law, that special

intervention was required to help all those otherwise-healthy children who were nonetheless unable to follow a standard curriculum. That is simply not accurate. Indeed, the notion of creating special classes for healthy “abnormal” children did not originate with Binet, or even with a psychologist. Rather, the idea was first proposed by a *psychiatrist* at the Bicêtre hospital: Désiré-Magloire Bourneville (1840–1909), a friend and collaborator to Jean-Martin Charcot (1825–1893), and one of France's most famous neurologists (see Gateaux-Mennecier, 1989, 2002, 2003a, 2003b). It also preceded the law.

2.1. Opposition between psychology and psychiatry: Binet vs. Bourneville

Bourneville created special classes, in 1879–1880, for the children with “special needs” in his psychiatric service. He also defended with conviction, albeit unsuccessfully, a proposal that these special classes be extended to “normal” primary schools (Bourneville, 1895, 1897, 1898, 1899). In other words, he sought to consolidate psychiatry's influence over the identification and management of all “abnormal” people and extend its reach into education; the domain of healthy children not otherwise subject to active medical supervision.

Bourneville's proposed classes would be populated using standard medical tests, screening actively for all those invisible “abnormal” children who were hidden amongst the healthy in “normal” schools. To support this, it would thus be necessary to develop a new educational infrastructure inside the asylums (for the most severe “educationally untreatable” cases referred from schools) while at the same time supplementing this with a new system of special schools (for those less severe “educationally unwell” cases which ought all the same to be under the expert care of medical professionals).

The paper that Bourneville delivered in September 1905 at the first *Congrès International d'Education et de Protection de l'Enfance dans la Famille* [International Congress on Education

³ For more on “epistemological violence,” especially as it afflicts the empirical social sciences, see Teo (2010).

⁴ There is a longer tradition, in the history of psychology, of recognizing the discipline as “polycentric” rather than focussed solely on American interpretations and results (following Danziger, 1994; see also e.g., Brock, 2006; Lombardo & Foschi, 2003; Pickren, 2009; Pickren & Rutherford, 2010; Teo, 2013).

and Child Protection in the Family] in Liège, Belgium, described his almost thirty years of work and reflection on the issue (Bourneville, 1905). His proposal, in short, was to universalize the system that he had put in place in and around Paris—with 250 boys at the Vaucluse Colony, 145 girls at the Salpêtrière, 235 girls at the Fondation Vallée, and 440 boys at the Bicêtre asylum (which had hosted the Marquis de Sade a century before). With this system, it was possible to hospitalize, treat, and educate, all without having to leave the building.

At this same meeting, however, Alfred Binet—then president of the *Société Libre pour l'Étude Psychologique de l'Enfant* (SLEPE) [Free society for the psychological study of the child]—presented a paper with a competing proposal. This summarized his work on a new *non-psychiatric* method to detect children who were healthy but still “behind” (*arriéré*) in their level of intelligence (Binet & Simon, 1905d). Indeed, Binet’s goal was to show on behalf of the SLEPE that *psychologists* could play a role in this detection (collaborating with educators to keep the identified children in schools), in direct contradiction of the proposal advanced by Bourneville (who sought to remove the children to his profession’s care). Yet to fully understand Binet’s intent, we must also understand the organization he represented, as well as his role within it.

2.2. Free society for the psychological study of the child (1899–1904)

The SLEPE was founded in 1899 by Ferdinand Édouard Buisson (1841–1932), who was then Professor and Chair of the Science of Education at the Sorbonne (also Émile Durkheim’s predecessor and, later, a recipient of the Nobel Peace Prize). Its purpose was the psychological study of normal children but also, *when necessary*, abnormal children too (see Buisson, 1900; also Boitel, 1902). Binet, who had joined the Society early on, was in charge of encouraging original works applying *experimental* psychological methods—rather than *clinical* psychiatric methods—to this task (see e.g., Binet, 1901).

This was not new for Binet. He had favored an experimental approach since 1890; that is, since he joined the physiological psychology laboratory at the Sorbonne (Nicolas & Sanitioso, 2012). But with the help of Buisson—who had served as Director of Primary Education at the Ministry of Public Instruction from 1879 until 1896—Binet also gained access to primary schools in Paris, which he used for his scientific work on memory (Binet & Henri, 1894a, 1894b,⁵ 1895a, 1895b) and to develop his program on individual psychology (Binet & Henri, 1896).⁶ Indeed, we suspect that the issues raised by the members of SLEPE were instrumental in guiding him to the types of project he ultimately chose to undertake in his research.⁷

Among the various questions discussed at the SLEPE meetings, those related to the place of “abnormal” healthy children in schools, were most vigorously debated (such as during the meeting of 12 June 1902, over which Binet had

presided [Anonymous, 1902]). The members concluded, for example, that such children ought to be submitted to a special examination *before* their exclusion from “normal” schools. And it was in this context that the question of the creation of “special schools”, and of “special classes” located within “normal” schools, came to be studied by psychologists.

A new committee of the SLEPE was formed on 12 February 1903 (see Binet, 1904a, 1904b). It was tasked with studying the differences—both physical and mental (using the then-standard anthropometric measures related to height, weight, and head size, as well as those related to perception, attention, memory, intellectual activities, judgment, etc.)—that separate “normal” from “abnormal” children. Its meetings were also dedicated to the development of a proposal: *Abnormal children in schools should be submitted to medico-psychological examination, with a view to determining if they could benefit from special pedagogical intervention*.

Here is the exact wording of the proposal voted-on, on 29 January 1904, by the members of that committee. Be it resolved:

1. That in primary schools, the children judged as being resistant to education, teaching, or discipline will not be expelled without first being submitted to a medico-pedagogical examination;
2. That these children, if identified as abnormal but treatable, will be grouped in a special class attached to the school, or in a special establishment [created for that purpose];
3. That as a demonstration, a special class for abnormal but treatable children would be opened at this time in one of the schools in Paris, specifically in the Jenner Street School, near the Salpêtrière. (our trans of Louette, 1904, p. 407)

To avoid any potential backlash, however, the committee members chose not to present the issues in detail. They also chose to avoid making any particular recommendations regarding the possible options (*viz.* special classes in asylums, special schools, boarding schools, etc.). Yet a question also remained unanswered: *Who exactly are these “abnormal” healthy children?*

2.3. Differential diagnosis of the abnormal in 1904

The classification of children with “abnormal”—or more precisely, here, “subnormal”—intelligence had not yet been clearly established. As Zenderland (1998) explained of the situation encountered by Goddard before he discovered Binet and then became the first English-speaker to translate Binet’s works:

Although most physicians crudely categorized their most severely impaired patients as “idiots”, those less impaired as “imbeciles”, and those only mildly impaired by a variety of names, including the generic term “feble-minded”, these categories had no accepted boundaries; an “idiot” in one institution could be an “imbecile” in another. Medical attention had produced a proliferation of case descriptions; yet instead of a single system of diagnosis and classification, these descriptions suggested an ever-increasing heterogeneity (pp. 74–75).

In other words, the clinical approach used by psychiatrists had produced to that point no unified system according to

⁵ See the English translation by Nicolas, Collins, Gounden, and Roediger (2011).

⁶ For more on the influence of these school children on his program, see Carroy (1991). For more on Binet’s first scientific collaborator, Victor Henri (1872–1940), see Nicolas (1995b).

⁷ Included in this influence are the well-known experimental studies of intelligence he conducted—between 1900 and 1902—on his two daughters (Binet, 1903; see also Andrieu, 2011).

which new cases could be compared and classified. This was a problem. But, again, it was not Binet who first attempted to solve it. That task was instead undertaken by his friend Emery Blin (1863–1930), who was a former collaborator of Charcot's and, as of 1891, chief MD at the Vaucluse Colony (see e.g., Blin, 1902).

Blin recruited a number of interns to do the heavy-lifting for his research, with Binet's guidance. One of these was Théodore Simon (1873–1961), who joined the hospital in 1899.⁸ His project involved undertaking a series of anthropometric studies—measuring height and weight, chest size, width of the shoulders, the circumference of the head, etc.—using the hospitalized boys as subjects (Simon, 1900a, 1900b, 1901a, 1901b). Blin then used Simon's studies as the basis for an experimental *psychological* method for the diagnosis of mental retardation. His next intern after Simon, Henri Damaye (1876–1952), developed these diagnostics still further and the results became Damaye's doctoral dissertation in *medicine* (Damaye, 1903).

Binet guided all of these projects from a distance, serving as an advisor in some cases and in others publishing the results in his journal: *L'Année Psychologique*, which he had co-founded with Sorbonne psychology lab director Henry Beaunis (1830–1921) in 1894.⁹ All of the projects were good, he thought, but none were perfect. In his criticisms of Damaye's dissertation, for example, Binet (1904d) emphasized that Damaye had not yet achieved a “true” test of intelligence. His method was too schematic and did not provide an adequate picture of the subject's aptitudes and ineptitudes. But Binet also seemed uninterested at the time in creating this more perfect type of test. It was only several months later, when public opinion began to sway toward the question of abnormality in schools, that he began to consider ways of improving upon the Blin–Damaye questionnaires.¹⁰

3. Recognizing a loophole in the law regarding universal education

Between the passage of the law on compulsory public education in 1882, and 1904, teachers rarely complained—either in the press or at meetings—about the presence of “slow” children in their classrooms (Vial, 1990, pp. 37, 52). Yet after the turn of the century, these complaints increased dramatically. In response, Radical-Socialist Senators Léon Bourgeois (1851–1925) and Paul Strauss (1852–1943) began to demand that the government take concrete action. The Minister of Public Education, Joseph Chaumié (1849–1919), then ultimately requested of the Inspector General of Public Education, Marcel (Maurice) Charlot (18..?–1921), that an inquiry be made—from an educational, rather than a medical, point of view—regarding the situation faced by these otherwise-healthy children.

3.1. Creation of a ministerial commission (October 1904)

Charlot's report was delivered to the Minister on 30 September 1904. It emphasized that the law of 1882 did not apply to children who—as a result of physical, intellectual, or

moral infirmity—were not able to follow a mainstream curriculum. Minister Chaumié then created, on 4 October 1904, a Ministerial Commission tasked with studying the situation in more detail. It was to be staffed by specialists in the study of abnormal children, as well as by representatives from the interior ministry and the public education system.

In the SLEPE Bulletin that November, Binet (1904c) informed his colleagues of the creation of the Commission, arguing that this confirmed that the questions studied by the SLEPE had important practical implications. It demonstrated that their efforts to institute reforms had not been wasted. Binet (representing psychology) and Bourneville (psychiatry) then joined the Commission, which was itself presided over by Senator Bourgeois.

3.2. Binet proposed a complete program for abnormal children (November 1904)

After being called to the unfortunately-named “Bourgeois Commission”, Binet wrote an article—which is little known today, even in French—on “The problem of abnormal children.” Dated 25 November 1904, and presumably circulated soon afterward, this appeared in the February 1905 issue of *La revue des revues* (Binet, 1905a; summarized in *L'Année Psychologique* by Decroly (1905b)).

Binet's purpose was to state his position, on the record, and to share it widely. He explained that “slow” children were unwanted both by schools and by hospitals. (The schools found them overly abnormal, while the hospitals dismissed them as insufficiently ill.) Their place, therefore, was in “special” education classes: neither in the hospital, nor in the school proper. But they still had to be educated.

For Binet, this was much more than a question of enforcing the law regarding compulsory universal education. Simply put, unschooled children were a danger to society. Unable to care for themselves, they would one day become a social burden: “They become parasites that consume, without any benefit to society, the work of hale and healthy men” (our trans of Binet, 1905a, p. 313). Indeed, driven by baser instincts and—because of their mental retardation—susceptible to bad advice and the poor examples set by lesser men, these children would inevitably turn to crime (cf. Mucchielli, 2006).

The transition from an “abnormal childhood” to a “criminal childhood” was, for Binet, direct and logical. More than this, though, it was a moral hazard that had to be addressed.¹¹ To

¹¹ A similar situation faced the United States at around the same time (see Zenderland, 1998, pp. 232–233). A more contemporary iteration of this view is provided by Johnson, Brett, and Deary (2010), who have shown that education serves a “pivotal role... in social class attainment” (pp. 55, 64). Without education, in other words, individual ability cannot lead to social advancement. And that can then also be understood to have an effect on the political development of nations as democracies, even when considered separately from increases in wealth (Rindermann, 2008a, 2008b). As a result, we can situate the scientific contribution of the Binet–Bourneville debate as pertaining primarily to the “normative level” in development: the outcome would make certain futures possible, but not others (see esp. Figure 2 in Burman, 2013, p. 369). Thus—in the terms provided by Johnson et al. (2010)—this debate was itself a “pivotal” moment in the history of Modern Western Civilization (see esp. the definition of “pivot” on p. 64). This is because its outcome ensured that a large group of healthy-but-otherwise-abnormal children were kept in school, rather than being excluded from both social advancement and democratic engagement.

⁸ For more about the relationship between Binet and Simon, see Wolf (1961).

⁹ See Nicolas (1995a, 1997) and Nicolas et al. (2000a, 2000b).

¹⁰ For a more detailed summary of Damaye's dissertation, in this connection, see Binet and Simon (1905b).

begin to undertake this further endeavor, Binet (1905a) then outlined four related questions:

1. *A medico-psychological question.* Special schools had to be opened for those with learning and medical disabilities, following a careful process of selection in normal schools. Binet thus proposed subjecting children to a double-screening: one (a) medical and anthropological and the other (b) psychological and pedagogical (pp. 315–319). In other words, he explicitly supported the role of psychologists in these examinations and allied them with the teachers.
2. *An administrative question.* There was uncertainty regarding where and how many of these special schools would be built, what the structure of the schools would be (boarding or day school), etc. (pp. 319–320).
3. *A pedagogical question.* The curriculum to be delivered in the special schools had to be simpler than that in normal schools because it was intended for children with less intellectual capacity (pp. 320–322). But how much simpler should the curriculum be?
4. *A social question.* All teaching in special schools should be directed toward integrating the abnormal children into society. This was the main purpose of the Commission, and if this goal was not achieved then the special schools would in turn fail a large part of their mission (p. 322).

These questions set the agenda for the discussions that followed.

3.3. Binet at the ministerial commission (December 1904–April 1905)

The first two meetings of the Bourgeois Commission took place on the 1st and 15th of December 1904. We do not know exactly what was discussed—there don't seem to be any minutes, aside from what was covered in Binet's (1905b) later report—but, on 2 February 1905, a pedagogical subcommittee was created with the aim of studying the measures that would be necessary to ensure that “retarded” and “unstable” children could benefit from the kinds of instruction implemented (Vial & Hugon, 1998).

In this subcommittee, which included Bourneville (the psychiatrist), Binet was named Secretary. Because of this position, he *should* have been able to play an influential role in shaping its outcomes. But that turned out not to be the case.

The final subcommittee report was presented—by Binet—in April 1905 (see Vial & Hugon, 1998, pp. 245–263). It did not mention psychological examination. Instead, it proposed giving jurisdiction over referrals to a board composed of a Primary School inspector, a Medical Doctor, and a Special School director, who would themselves conduct the medical and pedagogical examinations. There was no mention of the presence of a psychologist on this board, or the application of psychological methods, and we therefore conclude that Binet must not have been able to overcome Bourneville's influence in this respect. Yet Binet did continue to emphasize the importance of psychological methods in *L'Année Psychologique*, as well as at the International Congress of Psychology (held that very month).

4. Constructing the test

On 21 April 1905, Binet sent the text of a presentation—co-signed by Simon—to Sante de Sanctis (1862–1935), the Secretary General of the International Congress of Psychology. This contained a summary of their recent work, and—because neither Binet nor Simon could be present in Rome at the time—it was read by Beaunis (Binet's co-founder at *L'Année Psychologique*). We thus see Binet's collaborative network stepping in to fill gaps where he himself could not go.¹² (This later became the key to overcoming Bourneville's influence.)

4.1. Binet & Simon's presentation at the International Congress in Rome (April 1905)

Binet and Simon (1905a), as presented by Beaunis, focused especially on existing methods to identify normal and abnormal children. They emphasized that, to adequately diagnose the level of a child's intellect, three different approaches must be used:

1. *A medical approach*, examining anatomical, physiological, and pathological signs of intellectual inferiority (p. 509);
2. *A pedagogical approach*, evaluating intelligence based on acquired knowledge (p. 509); and
3. *A psychological approach*, based on observation and the measurement of differences in intelligence (pp. 508–509).

The medical approach is indirect, they explained, conjecturing about the mental from observations and measurements of physical appearances (cf. Galton [1883] on anthropometry). The pedagogical approach is more direct, enquiring about the consequences of a functional intellect applied over time to a set curriculum (cf. what was later called “crystallized” intelligence [Cattell, 1971]). And the psychological approach is the most direct, because it targets the intellectual state as it exists in the present via measures showing what the subject is capable of in terms of comprehension, judgment, reasoning, and creativity.

The medical approach reveals only *signs* of possible mental retardation, but has nonetheless been tenacious in its longevity (see Collins, 1999; Staum, 2007). The pedagogical approach also only reveals *possible* retardation; poor quality schooling would have the same effect (see Chitty, 2007). But the psychological approach, which can be consistently controlled and reproduced over time and across contexts, can ideally reveal *precise* and *replicable* indications of mental retardation.¹³ And it was in this connection that Binet and Simon presented—for the first time—the mental test that they had created for that purpose. This was published, in *L'Année Psychologique*, on 25 July 1905 (Binet & Simon, 1905c).¹⁴

¹² Further to this point, see Ciccola, Foschi, and Lombardo (in press) for additional information about how De Sanctis' and Binet's scales influenced intelligence testing after 1905.

¹³ That is not to say, however, that the resulting approach is without flaw (see e.g., Flynn, 2000; Flynn & Widaman, 2008).

¹⁴ In the *Persée* database of scientific journals, where much of *L'Année Psychologique* has been made available through open access (1894–2005), this article is listed as having been published in 1904. However, that is misleading: the date for volume 11 should read “1904–1905.” (The electronic record for the author names is also incorrect: in the article itself, Binet is named as first author [p. 244].)

Table 1

The contents and origins of the sub-tests included in the first metric scale of intelligence (Binet & Simon, 1905c), presented as the basis for the “psychological approach” advanced earlier as one of three necessary types of examination for children suspected of subnormal intelligence (for use prior to their referral to a special school).

Basic skills assumed of an “idiot”	
1. Object tracking. Coordination task, involving head movement and eye movement, to follow the motion of a lit match. For blind children, a similar task using sound can be used.	
2. Grasping provoked by tactile “excitation.” Coordination task, involving the hand and a small object (e.g., a piece of wood), such that the felt-object is taken and brought to the mouth without letting it fall.	
3. Grasping provoked by visual perception. Coordination task, involving the display of a small wooden cube, such that the observed-object is taken and brought to the mouth without letting it fall.	
4. Knowledge of food. Discrimination task, involving a piece of chocolate and a wooden cube of similar size (i.e., <i>After receiving the chocolate, does the subject still try to eat the wood?</i>).	
5. Food-seeking complicated by a minor mechanical difficulty. Task involving memory, the will, and the coordination of movements when a chocolate is wrapped in a piece of paper (i.e., <i>Does the child unwrap the chocolate before trying to eat it?</i>).	
6. Following simple directions and imitation of simple gestures. Tasks directed toward examining the coordination and association of movements, as well as the meanings of various gestures, with the explicit recognition that these are social interactions.	Blin (1902), Damaye (1903)
Differentiating between “idiocy” and “imbecility”	
7a. Verbal knowledge of objects. Tasks to demonstrate the existence of associations between words and things-named, with reference to parts of the body (e.g., “Where is your head?”) and familiar objects (e.g., “Give me the cup”). Again, this is explicitly social.	Blin (1902), Damaye (1903)
7b. Verbal knowledge of images. Task to demonstrate the existence of associations between words and things-named, with reference to their representation in an illustration of the complex family scene shown in Fig. 1 (e.g., “Where is the window?”).	Binet (1890b)
7c. Naming indicated objects. Task to demonstrate the existence of associations between things and their proper names, by naming the objects indicated by the experimenter in the provided illustration (e.g., “What is this?”). This task is the inverse of #7b.	
10. Comparison of two lines of different lengths. The first task that belongs recognizably to “experimental psychology”, this requires that the subject identify the longer line through several different presentations (e.g., comparing a 3 cm segment with a 4 cm segment, when separated by a space of 5 mm).	Binet (1890a)
11. Repetition of three numbers. Memory task, involving both “immediate” memory and sustained attention, with special notice for cases where the subject produces more than three numbers or when the subject seems satisfied with a response that is obviously wrong. An explicit differentiation is also made between “errors of attention” and “errors of judgment.”	Jacobs (1887), Binet (1894, 1895, 1900b), Binet and Hennequy (1892)
Differentiating between “imbecility” and “debility”	
12. Comparison of two weighted boxes. Task requiring sustained attention, visual perception, a decision to physically test the weights of two apparently-identical objects, and the comparison of muscular sensations. A more complex version of the task also varies the size of the boxes. For normal children, larger boxes with identical weight will appear to weigh less; this “illusion” does not occur in all subnormal cases (i.e., for those who are incapable of comparing the weights).	Binet (1900a)
13. Suggestibility. While not strictly speaking a test of intelligence, this step is important because suggestion can produce effects which are, in some respects, similar to the natural manifestations of feeble-mindedness. This set of three tasks therefore requires the identification of objects named by the experimenter but not provided (the inverse of #7a), the labeling of a picture using labels of unknown words (e.g., “Where is the <i>patapoum?</i> ”), and a variation on #10 in which the lines are of equal length (viz. “Which is longer?”). In this last case, it is the hesitation before answering which matters most.	Binet and Henri (1894a, 1894b, 1896), Binet (1900a)
14. Verbal definitions of known objects. Task involving language, specifically of the subject's aptitude for describing a simple idea (“fork”, “house”, etc.) and putting it into words (e.g., “A fork is to eat with” vs. “A house, it is a house”).	Binet (1890b)
15. Repetition of sentences of fifteen words. Task involving “immediate” memory, sustained attention, and language. These are not random assortment of words, however, and instead follow standard cultural patterns (e.g., “I rise in the morning, I dine at midday, I go to bed at night”). It is normal for subjects to substitute a simpler synonym (e.g., “eat”) for a more complex term (e.g., “dine”). Several sentences of varying difficulty are provided.	Binet and Henri (1895a, 1895b, 1896)
16. Comparison of known objects from memory. A task involving ideation, an understanding of the notion of “different”, and reflection on comparisons made between previously observed objects: “In what ways are they different? Why are they not the same?” At issue is whether the subject (a) understands the task at all, (b) responds with an absurdity, or (c) can provide a remotely reasonable reply.	
17. Exercise of memory involving images. A task requiring sustained attention and “visual” memory. Thirteen familiar objects are shown, together, for thirty seconds and then hidden. The subject is then asked to recall the names of the objects. In instances where a distraction may have affected performance, a different set of pictures is used and the task repeated.	Binet (1898b, 1900a)

(continued on next page)

Table 1 (continued)

Differentiating between “imbecility” and “debility”	
18. Drawing from memory. A task involving attention, visual memory, and some analysis. Two schematic images—one resembling a boxer (his torso posed in victory), and the other an open three-dimensional box seen from the front (and slightly to the right)—are presented for ten seconds each. The subject is then asked to reproduce them in turn.	Binet and Henri (1896)
19. Immediate repetition of numbers. Similar to task #11, but with special attention given to errors in judgment.	Jacobs (1887), Binet (1894, 1895, 1900b, 1903), Binet and Hennequy (1892)
20. Similarities between several known, remembered objects. A task requiring sustained attention, awareness of similarities, and dedication to detail (e.g., “How are poppies and blood similar?” and “In what ways are ants, flies, butterflies, and fleas similar?”). As with many previous tasks, it is important to first ascertain whether the subject knows what these objects are.	Binet and Henri (1896)
21. Comparison of lengths. Task aimed at the rapid discrimination of differences across a series of lengths, first varying between 30 cm and 35 cm (15 presentations of two lines per page) and then varying between 100 mm and 103 mm (12 presentations of two lines).	Binet (1890a)
22. Rank-ordering of five weights. Task involving sustained attention, an appreciation of different weights, and memory of previous decisions. Five small cubes of identical size and color are presented—weighing 3 g, 6 g, 9 g, 12 g, and 15 g—which are to be lined up in order of increasing weight.	Binet (1900a), Simon (1900c)
23. Identifying the missing object in a previously well-ordered set of weights. After the child has completed #22, their eyes are covered and one of the weights removed. After removing the blindfold: “Which weight is missing?” (If there is a question as to whether the boxes are truly identical, they are to be wrapped in paper before being unveiled.)	Binet (1903)
24. Rhyming exercise. Task involving vocabulary, mental flexibility, spontaneity, and broad intellectual activity: <i>Given a word, how many rhymes can the child find in a minute?</i>	Guicciardini and Ferrari (1897) (in English, see Lay (1898)); Binet (1903)
25. Providing missing words. Task requiring memory, linguistic competence, and judgment: “It’s nice out, so the sky is ____” (with increasing complexity).	Ebbinghaus (1897)
26. Inventing a sentence using three provided words. Task requiring spontaneity, inventiveness in combining words, and linguistic aptitude: “Given these words— <i>Paris, river, fortune</i> —what story can you tell in just one sentence?”	Binet and Henri (1896), Binet (1903)
Differentiating between “debility” and “normality”	
27. Reply to an abstract question. A task involving 25 questions of increasing complexity, to which the child must provide a sensible answer (e.g., “Before deciding something important, what should you do?” and “When someone offends you, but has apologized, what should you do?”).	–
28. Reversal of the hands on an analog clock. Task requiring reasoning, attention, and visual imagination. After the child has demonstrated that they are able to read an analog clock face, hide the clock and ask them to reverse the hands using mental operations only. (It is important to note when they claim to know the time, before reversing the hands, but then make a mistake in reading it.)	–
29. Paper cutting. Task requiring attention, reasoning, and visual imagination, but not language. The experimenter slowly and obviously folds a piece of paper in half, twice (i.e., to quarter its original size), then cuts out a triangle. The child is asked to draw, on a second identical piece of paper, what the first piece of paper will look like when it is unfolded.	Binet (1898a, 1898b)
30. Definition of abstract terms. Similar to #27, but more complex: “What is the difference between respect and friendship?” or “between boredom and unhappiness?”.	–

4.2. First version of the metric scale of intelligence (July 1905)

This test introduced the method of increasing difficulty that has come to characterize virtually all subsequent tests of intelligence: children were asked to perform tasks—such as to identify and explain the use of a common object, then repeat some numbers or short phrases, find rhymes, and finally formulate a coherent response to an abstract question—until they could no longer respond appropriately. In this way, all levels of intellectual deficit could be accommodated in a replicable and coherent fashion: if a child could not achieve above a certain standard level, then they could be grouped with others at their level and treated accordingly (*viz.* one curriculum for *idiots*, and another for *imbéciles*, with universal application).

The test itself was constructed quickly, in just a few weeks, and was based primarily on Binet’s work over the previous 15 years. Conveniently, too, the resulting examination typically took only a quarter of an hour to administer.

Table 1 provides a list of the sub-tests and their origins, with a view to organizing material now in the public domain that will inevitably come to be included in the new

PsycTESTS database. That said, however, it is not the aim of this paper to provide a history of how the items themselves were devised, revised, and retained. Indeed, a full accounting of those efforts would require its own further manuscript. But a few words are necessary to situate the resulting contribution. Thus, for example, the basic skills assumed of an “idiot” were assessed by tasks used by psychiatrists at the time. It seems likely that Simon, who was then an intern training to become a psychiatrist, was therefore the source of items 1 (object tracking), 2 (grasping provoked by tactile ‘excitation’), 3 (grasping provoked by visual perception), 4 (knowledge of food), and 5 (food-seeking complicated by a minor mechanical difficulty). Yet we have not so far been able to find the primary sources to support this conclusively. For others we have, though, such as item 6 (following simple directions and imitation of simple gestures), which had previously been used by Blin (1902) and Damaye (1903) in their studies.

Items differentiating “idiocy” from “imbecility” included three different types of sub-tests measuring verbal knowledge, visual ability, and short-term memory. The perceptual-verbal tasks (items 7a–c) were first by used Binet in 1890, when he

tested his daughters' perception of images (Binet, 1890b). The following test (item 10), involving the comparison of lines of different lengths, is also based on Binet's early experiments with his daughters. The test measuring short-term memory (item 11) is taken directly from an early study by the English psychologist Jacobs (1887). Indeed, Binet had made extensive use of the "span" measure in several previous experimental studies (Binet, 1894, 1895, 1900b; Binet & Hennequy, 1892).

In the long list of sub-tests used by Binet and Simon (1905c) for differentiating between "imbecility" and "debility", we find other tasks developed by foreign researchers. This is the case of the rhyming exercise (item 22), a task taken from the Italian psychologists Guicciardini and Ferrari (1897), as well as of the combination method (item 25) invented by the German psychologist Ebbinghaus (1897). Otherwise, the other sub-tests used in that section are the results of extensive experimental studies conducted by Binet (cf. Binet, 1900a, 1903; Binet & Henri, 1896).

The final sub-tests separating "debility" from "normality"—items 27 (reply to an abstract question), 28 (reversal of the hands on an analog clock), and 30 (definition of abstract terms)—seem new, since we were unable to find reference to these tasks in the books or papers written by Binet. Indeed, only item 29 had been used previously (Binet, 1898a, 1898b). It is possible that they were also taken from foreign literature, but further historical research will be necessary to say more about their origins. For our purposes here, however, it is sufficient simply to point to the confluence of events that led to the combination of all thirty items.

4.3. The contribution to knowledge

The result of the collection and use of all of these items together—and the first test's fundamental contribution—was to establish a progressive "metric" scale of intelligence: different levels defined according to different abilities. As Binet and Simon (1905a) explained, its use formalized the hierarchy of intellects in a way that had never before been attempted:

The *idiot* is that child who is incapable of identifying familiar objects (a pen, a key, a cup, a pin, a cork, string, dice, etc.) that are named for him, and placed in front of him... The *imbécile* is that child who is incapable of successfully performing simple tasks, such as repeating six digits, finding rhymes, or repeating phrases of 15 words after hearing them once. The *débile* [soon after called "moron" by Goddard (see Zenderland, 1998, pp. 102–103)] is that child who is incapable of finding an intelligent answer to an abstract question (our trans of p. 509).

These results were easily replicated. Indeed, the novelty of their approach was a result of the attempt at standardization that was not then-present in psychiatry (Bondy, 1974). Yet, despite positive evaluations by critics (e.g., Decroly, 1905a; Decroly & Degand, 1906), this was not their final product. Immediately afterward, Binet and Simon (1905d) declared:

We wanted simply to show that it is possible to observe in a precise, truly scientific manner the mental level of [a child's] intelligence, to compare this level to the normal level, and therefore conclude *the number of years that child is behind [arriéré]*. Despite the inevitable errors of a preliminary work... we believe that we have provided an adequate demonstration (our trans of p. 336; our emphasis).

Following this, in October 1905, Binet established the now-famous laboratory-school at Grange-aux-Belles that provided him with the infrastructure necessary to develop these ideas further (see Binet, Simon, & Vaney, 1906).

Binet and Simon's (1907) book on the admission of abnormal children into special classes did not include the full scale, as one would expect it would have done given its origins in the SLEPE, the Bourgeois Commission, and Binet's other organizing activities and administrative endeavors. Instead, our examination suggests a different purpose: the book attacked claims by MDs and psychiatrists that they could consistently and objectively identify abnormal children and then place them appropriately.

In short: the first contribution of the metric scale of intelligence was to allow for the consistent characterization of intellectual deficit, in a formal hierarchy, and the second was to ally psychologists with educators—against psychiatrists—so that these deficits could be addressed and the student returned to a normal school group. But it was not Binet himself, alone, who ultimately succeeded in pushing these innovations through.

4.4. Work in schools coincided with the construction of the tool

Binet's efforts in the Commission were largely unsuccessful in producing the changes he sought to make, despite what should have been the influence of his position. But his strong network of collaborations made up for his personal failings. By 1907, for example, there were five experimental "special" classes in Paris (Binet, 1907b). These had been organized with the support of Louis Bédorez (1849–1917), who was then Director of Primary Education of the Seine and, importantly, another friend of Binet's. Indeed, the first of these classes—with 19 students—had been opened in January 1907 following a request made directly by Binet himself (see Binet, 1908a, p. 60).

The psychologists, shepherded and corralled by Binet, had thus begun to win their first battles against Psychiatry: not only had the psychiatrists been excluded from the screening process in the Paris schools, but the children's progress after only one year of following Binet's program was also clearly evident (Binet, 1908b, 1908c; Levistre, 1908, 1910). Despite this, however, the most innovative aspect from our contemporary perspective—the metric scale—was not yet being used. As Binet explained:

I have chosen [these children] with the assistance of Dr. Simon, using a method that can be summarized as follows: we consider as retarded [arriéré], until proven otherwise, all children who are 3 years behind in their studies, provided that the delay is explained neither by illness nor by a lack of education; that is, by causes that

are independent of the child's intelligence and character (our trans of Binet, 1907b, p. 173).

In other words, before the introduction of the test, a child was defined as “slow” only if they had *not* been “sick” or “poorly educated” during the previous three year period of unsatisfactory progress. Thus, the two categories—*sick* and *slow*—were defined in opposition to each other. The test then colonized this territory: if a healthy and well-educated child did poorly on the test, then they would be “slow” by definition.¹⁵

A revision was published a year later, again in *L'Année Psychologique* (Binet & Simon, 1908). And it was this second version of the test that Binet (1908b) then acknowledged as having been used at Grange-aux-Belles, but still only after first using pedagogical methods and “only in cases where a three year mental retardation was previously observed” (p. 411). Thus the psychological test of intelligence came to be used only after *teachers* had indicated a need, rather than prospectively as Bourneville (the psychiatrist) had proposed.

5. Conclusion: Binet's contributions to “psychological science in the public interest”

The test, as we know it today, was built of these interactions: the original law of 1882 did *not* provide the impetus for Binet to construct it, as has been commonly understood. Instead, that interest—and indeed the successes which resulted—emerged only following a process of negotiation and collaboration: Binet was an actor in a larger network that extended well beyond his discipline to include teachers, bureaucrats, and politicians (cf. Latour, 2005). In excavating the resulting interactions, it is interesting to see that they also came to reshape the law itself.

5.1. Changing the law

The official report of the Bourgeois Commission was published in January of 1906. On 13 June 1907, a motion was then advanced in Parliament for the roll-out of special education classes across the Third Republic, but discussion was adjourned before a resolution was passed. Opponents highlighted the cost of funding this program, so debate continued—off and on, in Parliament and the Senate—for nearly two years.

On 15 April 1909, a new law was passed that led to the universal establishment of special classes, for “slow” children, to be attached to public elementary schools. As noted by Vial and Hugon (1998), this closed the loophole identified by Charlot that had led Minister Chaumié to create the Bourgeois Commission in the first place. But which types of

mental retardation were to be included? Supported by what kind of infrastructure? Using what methods?

Bourneville (the psychiatrist) had advocated screening for only the most severe cases, while Binet wished to include the broader population of “feeble-minded” children. For Bourneville, special classes should be an extension of asylums; he was thus in favor of creating a new kind of boarding school. But, for Binet, the classes should be an extension of the normal schools. And finally, Bourneville argued for the use of classical clinical procedures and medical questionnaires, while Binet wanted a three-step procedure including a standardized psychological examination.

Binet won on all three counts. The law passed in 1909 applied to all children. Special classes were attached to normal schools. And a standardized psychological examination was implemented, although only after a long struggle that concluded following Binet's death.

5.2. Final thoughts

When the members of the Bourgeois Commission were tasked with investigating the creation of special classes for abnormal children, a number of new problems were identified. We propose that Binet's involvement in the process of defining these problems led to his interest in related issues, especially the identification of children with special pedagogical needs, because—simply put—he perceived an opportunity for psychology to colonize an area of research that had historically been associated with psychiatry.

In short, therefore, we propose that Binet's heretofore-hidden motivation in building the first working test of intelligence was *strategic*; namely, his goal was for psychology to become a privileged partner to pedagogy. Thus, for Binet, psychology should be integrated with education to create a new domain of study: “pedagogical psychology” (Binet, 1909a, 1909b, 1909c, p. vi; see Avanzini, 1969).

In the French-speaking world, this goal was institutionalized following Binet's death by Edouard Claparède (1873–1940) and Pierre Bovet (1878–1965) through their establishment of the Rousseau Institute in Geneva in 1912. It then ultimately found full expression through the influence of Jean Piaget.¹⁶ In America, in addition to his direct influence on Goddard's and Terman's later efforts in intelligence testing, Binet's intent also came to be reflected in Lightner Witmer's (1867–1956) use of his test in creating special classes for “backward” children (see esp. Witmer, 1911) and the subsequent associated emergence of both “school psychology” (Fagan, 1996) and “clinical psychology” (McReynolds, 1997) as distinct psychological sub-disciplines.

Yet Binet's larger (now invisible) contribution was, simply put, to *make psychological* the question of identifying *abnormal* children *in schools* using scientific methods. The psychiatrists were suspicious of his intrusion into their domain because the study and treatment of the abnormal was theirs. For this reason, Binet was opposed at virtually every turn (see e.g., Nicolas & Ferrand, 2002). He then decided to construct a

¹⁵ This kind of thinking has since been extended to adult populations: adults who test as “slow,” but who are otherwise healthy, are “childlike”—again, by definition. (They were “delayed” in their development.) The *obvious* extension is then to compare test results from different kinds of society, modern and pre-modern, resulting in interpretations that are more consistent with the Victorian hierarchy than with contemporary humanistic approaches (see e.g., Oesterdiekhoff, 2012). A further extension, back into properly *medical* discourses, is that the consequences of abnormal cognitive decline—such as in Alzheimer's Disease—then come to be mischaracterized as a *reversion* to childhood (Neville, 2008). Our hope is that, by making this visible, we also make it easier to see alternative ways to interpret and characterize the found-differences.

¹⁶ One sometimes reads that Piaget “studied with” or “worked with” Binet. This is an error: although Piaget was indeed hired to work in Binet's laboratory-school at Grange-aux-Belles, they never actually met. Binet died in 1911, when Piaget was 15 (Wertheimer & Meserow, 1980). See Piaget (1975) for his reflections on Binet's contributions.

mental test, with the objective—we propose—of solidifying the professional identity of psychologists and their role (cf. Capshew, 1999). And it was this material psychological object, more than Binet himself (especially since he died soon afterward), that then achieved his goal.¹⁷

When Terman translated the Binet–Simon test, to create the “Stanford–Binet”, he extracted it from its *psychiatric* context and reproduced it as a *psychological* instrument. It then became obvious that the testing should be expanded to identify instances of “high functioning” as well (see esp. Hollingworth, 1930; also Klein, 2000; Silverman, 1990). And, as a result, psychiatry in America has not been able to muster a strong claim to school testing; the shaping of “intelligence” is the dominion of psychologists, for better or for worse (see Martin & McLellan, 2013). The war of words has thus been restricted to issues of who should be called “doctor” (see e.g., Cornell qtd. in Zenderland, 1998, pp. 254–255), who should have the power to prescribe (see e.g., Fox et al., 2009), and even—although we must remember that these tests were never intended by Binet to be used preemptively—whether the diagnosis of “learning disabilities” should rely on the results of intelligence testing at all (see e.g., Flynn, 2000; O'Brien, 2001).

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¹⁷ Yet its uptake and popularization was not universal: use in France was limited until 1960, for example, due in particular to opposition from psychiatrists (Carson, 2007; Huteau, 2005; Schneider, 1992).

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