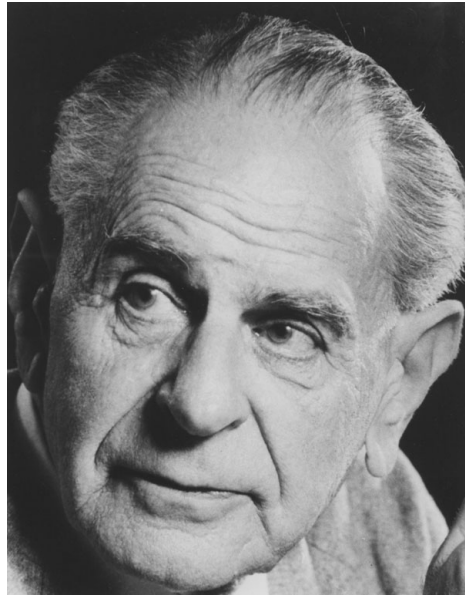


Pedro M. Rosario Barbosa



La Filosofía de Karl Popper

Introducción

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Capítulo 1

Biografía de Karl Popper

Karl Raimund Popper nació en Viena, la capital de Austria en 1902 de familia judía que se había convertido al cristianismo. Se educó bajo la religión luterana y se educó en la Universidad de Viena. En 1919, se volvió marxista, se unió a la Asociación de Estudiantes de Escuela Socialista y al Partido de Obreros Social-Demócratas. Más tarde abandonó el ideal marxista y gradualmente empezó a adoptar los ideales de liberalismo social. Su desilusión con el ideal marxista fue el motivo principal por el que Popper escribió su obra *La sociedad abierta y sus enemigos*.

Popper se doctoró en filosofía en 1928, y trató de integrarse a algunas discusiones filosóficas en el Círculo de Viena y grupos que admiraban a Ludwig Wittgenstein. De 1930 a 1933 como reacción al empirismo lógico, escribió una obra que no se publicó hasta 1979, titulada *Los dos problemas fundamentales de la teoría de conocimiento*, la que llegó a editar y publicar en 1934 bajo el título: *La lógica de la investigación científica*. Ésta sería la obra filosófica más importante de su carrera, y la que estableció los fundamentos para el resto de su carrera filosófica. En dicha obra él criticó varias corrientes de la época, especialmente el psicologismo y la corriente inductivista promovida por el empirismo lógico. Esa obra propuso la falsación como alternativa a la posición inductivista del método científico.

Más adelante, con el surgimiento del nacional-socialismo en Alemania, Popper emigró a Nueva Zelanda donde enseñó por algunos años. Luego se mudó a Gran Bretaña en la Escuela de Economía de Londres. Más adelante, en 1949, se volvió profesor de lógica y de método científico en la Universidad de Londres. Se le otorgó el título de “Sir” por la Reina Isabel II en 1965, y fue miembro de la Sociedad Real en 1975.

Durante su carrera académica, y aún después de que se retiró en 1969, Popper se mantuvo activo elaborando su filosofía hasta su muerte en 1994.

He aquí algunas de sus otras obras más importantes:

- *La pobreza del historicismo* (1934)
- *La teoría de los cuantos y el cisma en la física* (1956-57)
- *El universo abierto: un argumento para el indeterminismo* (1956-57)
- *El realismo y la meta de la ciencia* (1956-57)
- *Conjeturas y refutaciones* (1963)
- *Conocimiento objetivo: un acercamiento evolucionista* (1972)
- *El “yo” y su cerebro: un argumento por el interaccionismo* (escrito junto a John Eccles) (1977)
- *El mito del marco: en defensa de las ciencias y la racionalidad* (1994)
- *El conocimiento y el problema mente-cuerpo: en defensa de la interacción* (1994)

Capítulo 2: El Empirismo Lógico

Rechazo Filosófico al Psicologismo

La obra maestra de Kant, *La crítica de la razón pura* (1787), influyó significativamente en el pensamiento de la filosofía del siglo XIX. Hubo dos tendencias filosóficas que predominaron en el panorama filosófico del momento. El primero era una tendencia que elaboraba una metafísica especulativa que pretendía superar la distinción kantiana entre fenómeno y nómeno según planteada por Kant. A esta corriente se le conoció como “idealismo alemán”, cuya figura cumbre fue G. W. F. Hegel. La segunda, seguía la parte más científica de *La crítica*, en la que se investigaban las facultades mentales que hacían posible el conocimiento del mundo externo, además del conocimiento lógico y matemático.

Esta segunda corriente consideró a *La crítica* como una respuesta a los llamados empiristas ingleses. John Locke, Gorge Berkeley y David Hume hicieron una investigación psicológica del conocimiento humano, muy en línea con algo de espíritu cartesiano, pero en contra de René Descartes. Locke en particular, afirmó que *todo conocimiento del mundo era fundamentalmente conocimiento de ideas* (en el sentido psicológico). Con ese planteamiento surge el “**psicologismo**”. Por “psicologismo” se entiende toda una variedad de doctrinas filosóficas que tienen en común la reducción de varios campos del saber a operaciones o representaciones psicológicas. John Stuart Mill fue el filósofo más destacado entre los psicologistas por llevar su concepción de las matemáticas y la lógica a un extremo.

Aquí distinguiré tres tipos de psicologismos, dependiendo del campo al que se reduce a la psicología:

1. **Psicologismo lógico:** Este psicologismo considera a la lógica como leyes del “recto pensar”. Por ende, la lógica debe considerarse como una rama de la psicología.

2. **Psicologismo matemático:** Éste considera a los números y a otros objetos matemáticos como constructos o representaciones psicológicos o abstracciones de la experiencia sensible.
3. **Psicologismo epistemológico:** Éste considera el conocimiento del mundo en última instancia como conocimiento de las ideas psicológicas abstraídas a partir de la experiencia sensible.

A finales del siglo XIX y principios del XX, los primeros dos psicologismos fueron blancos de ataque de dos filósofos: Gottlob Frege y Edmund Husserl.

De los dos filósofos, la refutación ofrecida por Husserl en sus *Investigaciones lógicas* fue la más contundente y poderosa. Algunos consideraron su refutación como “memorable”. Para Frege como para Husserl, la validez de los principios y los axiomas lógicos no pueden fundamentarse en la mente humana. Las verdades de la lógica y de las matemáticas constituyen lo que llamaba David Hume “relaciones-de-ideas” (*relations-of-ideas*), es decir, verdades cuya negación implica necesariamente una contradicción, o juicios analíticos según definida por Frege y Husserl respectivamente. Éstas verdades son *a priori* e implican necesidad lógica. Sin embargo, la psicología es una ciencia empírica, y pertenece al ámbito de los hechos (*matters-of-fact*), cuya negación no necesariamente implica una contradicción. Todos nuestros conocimientos sobre hechos son sólo probables, mientras que los de la lógica y las matemáticas son completamente ciertos. Por esto, y por otras razones, la psicología, una ciencia vaga e imprecisa, no puede fundamentar la lógica y las matemáticas. Lo que sí ocurre es que la lógica y las matemáticas son fundamento *a priori*, no sólo de la psicología como ciencia, sino de *todas* las ciencias empíricas.

Esta crítica devastadora fue ignorada por unos, pero llevó a otros a cambiar de parecer en torno al curso de acción de varios filósofos de este tiempo. Frege propuso utilizar una especie de lógica simbólica que llevara a la filosofía a ver los argumentos más claramente, sin intrusión alguna de la psicología. Sin embargo, la conceptografía (la simbología elaborada por Frege) no era ideal para ese propósito. Hubo otros filósofos que elaboraron una simbología más adecuada, tal como la propuesta de Boole o la de Bertrand Russell.

Estas críticas al psicologismo llevaron a varios filósofos a comprender algunas de las flaquezas de la filosofía kantiana, aún bajo la versión modificada: el **neokantismo**. Frege y Husserl, quienes siguieron la línea de Leibniz, Bernard Bolzano y Hermann Lotze, refutaron la

tesis de que las matemáticas en general se consideran sintéticas *a priori*, alejándolas así de la lógica. Además, los avances de la geometría no-euclidea y la geometría analítica hicieron que el punto de vista kantiano de la geometría cayera en la obsolescencia. Finalmente, los planteamientos de Henri Poincaré con respecto a las geometrías euclidea y no-euclidea, y los avances de las ciencias debido a la formulación de las teorías especial y general de la relatividad planteadas por Einstein, hicieron que la epistemología de Kant cayera en crisis.

Algunos filósofos pensaron que era hora de volver a crear los fundamentos filosóficos para una verdadera teoría del conocimiento.

Bertrand Russell “Sobre el Denotar”

Frege tuvo su impacto en la filosofía del lenguaje, especialmente gracias a su ensayo “Sobre sentido y referente”. Sin embargo, dicho ensayo dejó en muchos un mal sabor debido al realismo lingüístico por el que abogaba, al concebir a los sentidos (significados) como entidades abstractas, pero reales. Bertrand Russell rechazaba este platonismo fregeano, ya que sostuvo un punto de vista fisicalista, aunque también antipsicologista.

En 1905, Russell escribió un ensayo que influiría la filosofía del lenguaje hasta hoy día titulado “Sobre el denotar” (*On Denoting*). La razón de ser de esta obra era buscar la manera de darle la vuelta a los sentidos de tal manera que las frases denotantes (“la estrella de la mañana”, “el derrotado en Waterloo”) se refirieran de manera directa a los objeto que denotan, sin que los sentidos o los significados jueguen un rol en la lógica ni la semántica. Aunque su línea de argumentación es un tanto confusa, debido a que confunde a los planteamientos de Frege y a los de Meinong, Russell consigue en su ensayo un triunfo parcial.

No discutiremos el ensayo con lujo de detalles, sino aquello que es pertinente para nuestro tema. Para Russell, hay dos clases de conocimiento:

- ***Conocimiento por familiaridad*** (*knowledge-by-acquaintance*): este conocimiento consiste en aquél que proviene de la experiencia directa del mundo.
- ***Conocimiento por descripción*** (*knowledge-by-description*): éste consiste en aquel conocimiento que proviene de descripciones a partir de lo que conocemos mediante conocimiento por familiaridad.

Contrario al conocimiento por familiaridad, el conocimiento por descripción es conocimiento indirecto, y para comprenderse tiene que hacer referencia al conocimiento directo. Por ejemplo, si alguien nos dice que tiene un dolor de cabeza, no podremos percibir de manera directa su dolor de cabeza, pero podemos asociar su descripción del dolor de cabeza con otras instancias que la hemos tenido. Para esa persona, su experiencia de dolor de cabeza sería conocimiento por familiaridad, mientras que para nosotros sería conocimiento por descripción.

Ahora bien, muchas de las frases que Frege considera nombres propios, Russell las considera frases denotantes, o más bien **descripciones definidas**: “el rey de Francia actual”, “la estrella de la mañana”, “el vencedor en Jena”, “el autor de *Waverley*”. Uno de los argumentos presentados por Russell en “Sobre el denotar” es que estas descripciones definidas deben considerarse como una suerte de predicados necesitados de saturación. Todas las descripciones definidas son “símbolos incompletos”, por así decirlo. De esta manera, “el autor de *Waverley*” no expresaría un sentido o un significado, sino más bien sería un signo (un símbolo) que describe a un objeto particular: Sir Walter Scott. Tomemos la frase “el autor de *Waverley*” como un símbolo incompleto necesitado de saturación de esta manera:

() es el autor de *Waverley*.

Si se rellenara el vacío con Sir Walter Scott de esta manera

(Scott) es el autor de *Waverley*.

entonces dicha oración sería verdadera. Si se rellenara el vacío de esta manera

(Barack Obama) es el autor de *Waverley*.

entonces sería falsa.

De esta manera se pueden utilizar descripciones que son de por sí significativas, pero no permitirían ser sentidos o significados por sí solos, cosa que él repudiaba del platonismo.

El Joven Ludwig Wittgenstein: el Tractatus

Ludwig Joseph Johan Wittgenstein, un joven filósofo austriaco relativamente desconocido, fue discípulo tanto de Frege como de Russell, y su filosofía incluye aspectos de la filosofía de ambos, aunque tuvo sus marcadas diferencias. Wittgenstein adoptó de Frege el **principio de contexto**: nunca considerar el significado aislado de una palabra sino según se infiere a partir del

contexto en que aparece. Su primera obra era el *Tractatus Logico-Philosophicus*, en la que él hacía un alegato muy modesto: con el *Tractatus* se resuelven **todos** los problemas de la filosofía.

Acto seguido procede a organizar toda una serie de aforismos:

1. El mundo es todo lo que es el caso.
 - 1.1 El mundo es la totalidad de los hechos, no de las cosas.
 - 1.11 El mundo está determinado por los hechos, y por su ser *todos* los hechos.
 - 1.12 La totalidad de los hechos determina lo que es el caso, y también lo que no es el caso.
 - 1.13 Los hechos en el espacio lógico son el mundo
 - 1.2 El mundo se divide en hechos.
 2. Lo que es el caso —un hecho— es la existencia de estados-de-cosas.
 - 2.01 Un estado-de-cosas es una combinación de objetos.
- ...

Ahora bien, en este escrito compuesto de aforismos, algunos de ellos crípticos, Wittgenstein argumenta que hay problemas filosóficos genuinos, y pseudo-problemas. Los problemas filosóficos genuinos son aquéllos que tienen que ver con los estados-de-cosas actuales en el mundo. Estos problemas tienen *sentido*, mientras que los otros son un *sin-sentido*.

De acuerdo con Wittgenstein, el problema de la filosofía es que frecuentemente se ha dejado dominar por pseudo-problemas, problemas metafísicos, problemas sin-sentido. Las ciencias son las que se ocupan de los hechos del mundo. El proceder correcto de la filosofía es el no hablar excepto de lo que se puede decir algo (las proposiciones de las ciencias naturales). Todos los demás problemas, como los de la metafísica y de la ética, son pseudo-problemas, y no deberíamos hablar de ellos.

Los Comienzos del Empirismo Lógico

Como hemos señalado, debido a los grandes cambios en la filosofía y las ciencias, muchos filósofos vieron la necesidad de reconstruir las bases filosóficas para una teoría de conocimiento

viable. Los escritos de Frege y de Russell influyeron para que se sentaran las bases lógicas y semánticas de una epistemología de las ciencias naturales que sustituyera la filosofía kantiana y la neokantiana. Al mismo tiempo, dicha epistemología debía erradicar los elementos metafísicos especulativos en los que cayó gran parte de la filosofía gracias al idealismo alemán, particularmente a Hegel.

El primer libro en torno a dicho proyecto fue *Teoría general del conocimiento* de Moritz Schlick (1918). A pesar de no estar bien formado en lógica, él afirmaba en el libro que había necesidad de establecer una distinción entre una filosofía genuina que fuera base del conocimiento y las pseudo-filosofías. En gran medida, en un espíritu no-platonista pero antipsicologista, e influido por la filosofía del matemático Henri Poincaré, él afirmaba que la lógica y las matemáticas debían ser *convenciones* que debían sentar las bases de las ciencias naturales. Las aserciones de las ciencias naturales debían ser lógicas y matemáticamente consistentes, mientras que todo lo referente a los hechos debía ser contrastado con la experiencia del mundo. Ahí queda descartada toda filosofía metafísica y se garantizaría el verdadero conocimiento.

Otro filósofo que también trabajó extensamente en torno a este mismo problema fue Hans Reichenbach en su libro *La teoría de la relatividad y el conocimiento a priori* (1920). Allí criticó extensamente la filosofía kantiana y postuló la necesidad de crear unas nuevas bases del conocimiento científico a la luz de los nuevos descubrimientos de la teoría especial y general de la relatividad de Einstein. Para Reichenbach, sólo pueden existir las proposiciones analíticas *a priori* o sintéticas *a posteriori*, pero se descarta la clasificación kantiana de proposiciones sintéticas *a priori*. Reichenbach estableció una distinción entre:

- **Axiomas de Coordinación:** Reglas generales adoptadas convencionalmente por las que se fundamentan las leyes y las teorías científicas. Éstas incluyen las reglas lógicas y matemáticas, y los conceptos más fundamentales de las ciencias.
- **Axiomas de Conexión:** Estas reglas utilizan los axiomas de coordinación para “conectar” unas variables con otras, cosa que ocurre tanto con la física newtoniana con las teorías de la relatividad de Einstein.

Con el propósito de establecer una labor filosófica empirista, Moritz Schlick creó el Círculo de Viena, mientras que Hans Reichenbach estableció la Escuela de Berlín. El movimiento

filosófico que caracterizó ambas organizaciones se conoció con los nombres “**positivismo lógico**” o “**empirismo lógico**”.

La Influencia de Russell y Wittgenstein

En la época temprana, el empirismo lógico recibió la influencia de Bertrand Russell, especialmente de su ensayo “Sobre el denotar” y obras semejantes que él escribió durante su vida. Además, A. N. Whitehead y Bertrand Russell habían desarrollado una notación lógica mucho más viable que la de Frege, e intentaron utilizarla para un proyecto logicista más ambicioso. Ellos dos publicaron una obra titulada *Principia Mathematica* (1910-1913, segunda edición 1928) en la que quisieron demostrar que todas las matemáticas pueden derivarse de la lógica de primer orden. El empirismo lógico tuvo en cuenta tanto la semántica russelliana en la que se descartaban los significados como entes aislados, y a la misma vez adoptaron esta nueva notación para sus investigaciones lógicas.

Sin embargo, fue el *Tractatus* de Wittgenstein, el que influyó más en torno a dicho movimiento. Uno de los problemas del empirismo lógico era el del llamado **problema de demarcación**: ¿cómo se puede determinar qué es metafísica o pseudo-ciencia y qué es ciencia? La obra de Wittgenstein estableció el criterio. Schlick, para todos los efectos, se volvió religiosamente wittgensteiniano una vez leyó el *Tractatus*, y para todos los efectos respaldó la filosofía de Wittgenstein el resto de su vida.

Rudolf Carnap

Otra figura que influyó en el positivismo lógico fue Rudolf Carnap. En sus primeras obras filosóficas estuvo fuertemente influido por la filosofía husserliana, aunque tradicionalmente se le ha asociado con el neokantismo. Sin embargo, en su obra *El espacio* él utiliza la fenomenología y la terminología de Husserl extensamente para forjar su filosofía sobre los espacios matemáticos y el físico para fundamentar epistemológicamente la teoría general de la relatividad.

Más adelante, en *La estructura lógica del mundo*, él utilizó la fenomenología de Husserl junto a la lógica formal según desarrollada por Whitehead y Russell para forjar su propia teoría epistemológica del mundo. Podemos ver claramente que usó el concepto de constitución jerárquica, la reducción fenomenológica (*epoché*), la noción de constitución del “yo” y de otras

conciencias. El Carnap temprano tenía poco de neokantismo y mucho de fenomenología husserliana. Incluso, en una obra posterior, cuando abandonó casi toda su filosofía anterior (incluyendo la influencia husserliana), aparece la distinción carnapiana entre leyes de formación y leyes de transformación en la lógica formal, que son esencialmente la distinción husserliana entre reglas para evitar el sin-sentido y las reglas para evitar el contra-sentido.

Aún así, Carnap se unió al Círculo de Viena, y debido a la rivalidad que había entre Schlick y Husserl, Carnap escondió la influencia de Husserl en su obra, la disfrazó de neokantismo.

Él también fue influido por la filosofía de Wittgenstein, y en gran medida la adoptó. Su estímulo para rechazar tajantemente la metafísica provino de la obra de Martin Heidegger, quien se alejó del ideal de la fenomenología como ciencia exacta y cayó en la metafísica especulativa. En su ensayo “La eliminación de la metafísica mediante un análisis lógico del lenguaje”, Carnap afirmó que el problema de filósofos especulativos tales como Hegel y Heidegger es que abusan del lenguaje, especialmente mediante el uso de palabras que no tienen significado o sentido alguno. Siguiendo el razonamiento de Wittgenstein, los únicos problemas genuinos y con sentido son aquéllos planteados por las ciencias naturales. Los planteamientos metafísicos son todos carentes de significado.

Fracaso del Empirismo Lógico

Hubo varios factores que contribuyeron a que finalizara el empirismo lógico. Uno de ellos fue sociológico. El incremento del poder del nacional-socialismo en Alemania llevó a los miembros del empirismo lógico al exilio, porque la mayor parte de ellos eran judíos. De hecho, algunos de los empiristas lógicos estaban motivados por un espíritu anti-Nazi, porque creían firmemente que una vida intelectual que aspirara a la claridad de pensamiento podía ser resistencia a cualquier gobierno opresor basado en la demagogia. Esto no fue algo que le gustó mucho al gobierno Nazi. Los ataques de Carnap a Heidegger tienen algo que ver con este asunto, ya que Heidegger se asoció con el Tercer Reich. Aún así, este factor no lo fue todo.

Wittgenstein se dio cuenta de que, contrario a lo que afirmó en el *Tractatus*, los problemas de la filosofía todavía continuaban. También había cambiado de posición filosófica a una en la que los problemas genuinos de la filosofía son los del lenguaje. Sin embargo, Wittgenstein

continuaba pensando que los problemas metafísicos son esencialmente pseudoproblemas. Él seguía concibiendo a los significados de manera no-platónica, y mantuvo su convicción de que ellos sólo tienen validez (junto a la lógica y a las matemáticas) si éstos son semánticamente útiles. Desafortunadamente, entre los llamados “pseudoproblemas” seguían encontrándose los problemas éticos, los problemas en cuanto a problemas de las matemáticas, entre otros.

Una vez rechazamos la metafísica desde el principio, hemos de preguntarnos por qué deberíamos todos adoptar la posición empirista lógica y rechazar la metafísica. Esta misma pregunta sólo la puede contestar la metafísica. Así que el empirismo lógico queda en última instancia injustificado. Éste no es capaz de justificarse a sí mismo, porque cualquier justificación filosófica sería por definición metafísica..

Este rechazo tajante a la metafísica, a *cualquier* metafísica, lleva al empirismo lógico a un callejón sin salida, ya que se le hace imposible justificar su posición. Moritz Schlick, por ejemplo, reconoció que bajo el empirismo lógico es imposible justificar afirmaciones *universales* sobre la realidad, y por lo tanto ***las leyes naturales quedan irremediabilmente rechazadas***. Así que el criterio de demarcación entre ciencia y metafísica a la empirismo lógico haría que las leyes naturales queden excluidas de la ciencia, y, por ende, sería costosa para la física, la biología, la química y todas las demás ciencias. Habría que “destruir la villa para salvarla”.

Esto se debe en parte a que la ***inducción*** determina el criterio de demarcación. La inducción consiste en partir de diversos eventos de la experiencia para abstraer de ellos y llegar a leyes generales. El problema con la inducción es que nuestra experiencia es solamente parcial, nunca universal. Es decir, nosotros podemos ver que dos objetos son afectados por la fuerza gravitacional, pero no podemos experimentar *universalmente* las leyes universales de gravitación. Por ende, es sencillamente imposible justificar leyes universales a partir de experiencias particulares.

Finalmente, Hans Reichenbach mencionó un problema serio con la dependencia en la inducción: es imposible proveer una teoría del conocimiento fundada en la inducción mientras los argumentos de David Hume contra la inducción no fueran superados. Éste fue uno de los blancos utilizados por Karl Popper, quien fue uno de los filósofos que contribuyó a finalizar ese proyecto.

Capítulo 3

La Propuesta de Popper: Conjeturas y Refutaciones

El Problema de la Inducción: La Espina de Hume

Karl Popper estaba muy familiarizado con la obra de David Hume, muy especialmente *Investigaciones concernientes al entendimiento humano* donde él discute el problema de la inducción a fondo.

Hume establece la diferencia entre relaciones-de-ideas y hechos (*matters-of-fact*), que serían para Popper los mismos criterios para establecer su distinción semántica entre proposiciones analíticas y sintéticas. Las primeras son lógicamente necesarias y sólo se pueden descubrirse por vía racional (*a priori*), mientras que las segundas son contingentes y sólo pueden descubrirse por la experiencia (*a posteriori*). Si se negara una verdad del ámbito de relaciones-de-ideas, se obtendría automáticamente una contradicción, no es así con respecto a las verdades de hechos.

Ahora bien, la inducción es esencialmente una generalización a partir de experiencias particulares, y “predice” que el futuro será como el pasado. Por ejemplo, si he tenido un cierto número de experiencias en las que el pan me nutre, infiero que en futuras ocasiones en que comeré pan, éste me nutrirá. Si he tenido un número de experiencias en las que sale el sol por la mañana, así será siempre en el futuro.

Obviamente, hay algo mal en estas inferencias. Toda experiencia pertenece al ámbito de los hechos (*matters-of-fact*), lo que quiere decir que su negación no necesariamente implica una contradicción. Si esto es así, la inferencia de que el futuro será siempre como el pasado es un *non-sequitur*. ¿Cuál sería pues la justificación lógica para este tipo de creencia? Si se

argumentara que esto es así porque cuando uno ve eventos semejantes en el pasado siempre ha sido así más tarde, entonces se cae en un círculo vicioso.

Esta crítica fue un golpe para la epistemología newtoniana, que valoraba la inducción como el mecanismo para descubrir las leyes de la física, y para formular las teorías que “prometen” que el futuro siempre será como el pasado.

Popper valoraba esta crítica, pero quiso ir más allá. Como hemos visto, el basar las ciencias en la inducción haría que las leyes universales de las ciencias naturales dejen de tener validez, que a fin de cuentas ellas pertenecen al ámbito hechos (*matters-of-fact*) y que existen sin justificación lógica alguna. Demarcar la metafísica y las ciencias de esta manera sería sacrificar lo más preciado de las ciencias: las leyes científicas.

Sin embargo, hay una falacia más profunda involucrada en la llamada “inducción” y que Hume nunca se percató de ella. La inducción parte de la premisa de que el pensamiento científico comienza con la observación, para después generalizar. Popper nos da un ejemplo para demostrar que esta forma de concebir las ciencias es absurda:

Hace veinticinco años traté de explicar esto a un grupo de estudiantes de física en Viena comenzando una clase con las siguientes instrucciones: “tomen papel y lápiz, observen cuidadosamente y escriban lo que han observado.” Me preguntaron, por supuesto, *qué* es lo que yo quería que observaran. Evidentemente, la indicación “¡observen!” es absurda . . . La observación siempre es selectiva. Necesita un objeto elegido, una tarea definida, un interés, un punto de vista o un problema.¹

En otras palabras, ***la observación presupone un marco teórico para poder ser posible***. Por lo tanto, nunca se comienza por la observación, sino ***se empieza por la teoría***. Es la teoría la que determina lo que debemos observar, y no es la observación por sí sola la que nos permite formular teorías. Incluso, aún si quisiéramos afirmar que las leyes científicas son productos de la repetición constante de ciertos eventos, esta aseveración se basa en la creencia de que psicológicamente podemos inducir ciertos patrones. Sin embargo, esta detección de patrones *supone* una “teoría mental” de que estos patrones existen y que debemos estar a la expectativa de dicha detección. Las repeticiones y los patrones siempre lo son desde un cierto punto de vista, pero este punto de vista *presupone* antes de que pueda haber *para nosotros* alguna repetición o patrón.

He aquí una de las más grandes contribuciones de la filosofía de Popper: no puede haber inducción, ni lógica ni psicológica. Dice Popper:

La teoría de las *ideas* innatas es absurda, creo; pero todo organismo tiene *reacciones* o *respuestas* innatas, y, entre éstas, respuestas adaptadas a sucesos inminentes. Podemos llamar a estas respuestas “expectativas”, sin que esto implique que tales “expectativas” sean conscientes. El niño recién nacido “espera”, en ese sentido, ser alimentado . . . Dada la estrecha relación entre expectación y conocimiento, hasta podemos hablar, en un sentido totalmente razonable, de “conocimiento innato”. Este “conocimiento” no es, sin embargo *válido a priori*; una expectativa innata, por fuerte y específica que sea, puede ser equivocada. (El niño recién nacido puede ser abandonado y morir de hambre.)

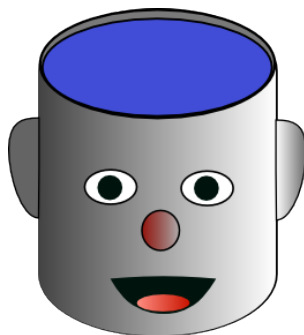
Así, nacemos con expectativas, con un “conocimiento” que, aunque no es *válido a priori*, es *psicológica o genéticamente a priori*, es decir, anterior a toda experiencia observacional. Una de las más importantes de estas expectativas es la de hallar una regularidad. Está vinculada a una propensión innata a buscar regularidades o una *necesidad de hallar* regularidades, como podemos verlo en el placer del niño que satisface esta necesidad.²

En otras palabras, el acercamiento a las ciencias vía la inducción es uno simplista. Si la inducción es un mito (en el sentido peyorativo de la palabra), entonces no puede ser fundamento para una lógica de la investigación científica.

Crítica al Psicologismo Epistemológico

En *La lógica de la investigación científica*, Popper atacó el “psicologismo” al que él definió de la siguiente manera: la doctrina de que las afirmaciones pueden justificarse no sólo por otras afirmaciones sino también por la experiencia perceptual.³ Esto aparenta estar desasociado con la definición de “psicologismo epistemológico” que ofrecimos anteriormente, pero no es así. Al contrario, él lo ve como una herencia del pensamiento de los empiristas ingleses.

Popper ilustra el psicologismo epistemológico como una doctrina asociada a lo que él llama la *doctrina cubo de la mente*:



Teoría Cubo de la Mente

Supongamos que la mente es como un cubo que se “llena” o se “acumula” a partir de sensaciones que percibimos gracias a los cinco sentidos representados en la ilustración. Al recibir los datos sensoriales, descubrimos ciertas semejanzas en lo que percibimos, nos percatamos de la repetición de eventos, y descubrimos ciertas reglas o leyes. Es esta costumbre la que nos conduce a esperar regularidades. Una vez las encontramos, esto justifica nuestra creencia en leyes regulares. Así que el conocimiento contiene ideas que son forjadas a partir de las sensaciones.

Sin embargo, Popper no simpatiza con este punto de vista de la mente. De hecho, al igual que Frege y Husserl, él desarrolla una teoría antipsicologista de los significados. Russell quiso eliminar la concepción autónoma de los significados, en que se distinguen del objeto y del signo. Popper los recupera.

Aunque no sigue fielmente a Frege, se inspira en él. Él establece la distinción entre signo, sentido y referente. No está claro en Popper si un nombre propio (Aristóteles, Napoleón) tiene sentido o significado, pero Popper parece implicar que sí. Ahora bien, descripciones definidas como “la estrella de la mañana” o “el derrotado en Waterloo” no se consideran nombres propios en Popper. El sentido de las descripciones definidas depende del significado de cada una de las palabras en ellas. Ahora bien Popper tiene diferencias con Frege en cuanto al sentido y referente de nombres universales (lo que sería equivalente a las “palabras conceptuales” de Frege). Para Popper, el concepto es el sentido de un nombre universal, y su referente es la extensión de concepto.

Finalmente, Popper coincide con Frege en decir que el sentido de una oración declarativa es un pensamiento o una proposición, pero difiere de él en cuanto al referente. Para Popper, el referente de una oración declarativa es un *hecho*. Un hecho, para él, es semejante a la noción de

situación-de-cosas en Husserl. Para él, las proposiciones expresadas por las oraciones “Pedro es mayor que María” y “María es menor que Pedro” se refieren a uno y el mismo hecho.

Podemos resumir así la teoría de sentido y referente en Popper:

<i>Signo</i>	Nombre Propio (en sentido estricto)	Nombre Universal	Oraciones Declarativas
<i>Sentido</i>	Sentido de Nombre Propio	Concepto	Pensamiento, Afirmación o Proposición
<i>Referente</i>	Objeto	Extensión de Concepto	Hecho

Finalmente, hay que señalar, que Popper se inspira en los trabajos de Alfred Tarski, e integra su definición de verdad a su semántica. De acuerdo con la definición informal de Tarski, una oración es verdadera si ésta corresponde a un hecho. Por ejemplo: La proposición “la nieve es blanca” es verdadera si y sólo si la nieve es blanca. Para Popper, la verdad es una relación entre una proposición y un hecho. Si la proposición corresponde a un hecho, ésta es verdadera, y si no es así, entonces es falsa.

Psicología del Conocimiento vs. Lógica de Investigación Científica

¿Por qué este énfasis en los sentidos o significados? Popper cree que una de las grandes fallas del empirismo lógico es la subestimación de los significados, y esto ha llevado a errores en cuanto a la comprensión de las ciencias. Éste fue uno de los errores que comparten el psicologismo y el empirismo lógico. El énfasis no debería ser en una “psicología del conocimiento” sino en una ***lógica*** de la investigación científica. Una vez más, nos parece recordar a Frege y su distinción entre lo psicológico y lo lógico como principio para recuperar la objetividad de las verdades.

Un ejemplo de cómo el énfasis en los significados es más fructífero lo hallamos en toda la discusión en cuanto al psicologismo y la inducción. Desde la perspectiva de la psicología del conocimiento, la inducción es ***el*** medio indispensable, y ésta a su vez se basa en la ***teoría frecuencial de la probabilidad***: mientras más veces ocurre un fenómeno o un evento, se verifican más las teorías científicas que dan cuenta de éste.

La *lógica* de la investigación científica se centra más bien en una *lógica de probabilidades* (o cálculo de probabilidades): una teoría es *mejor* cuando es *menos* probable. Este alegato parece descabellado si se mira superficialmente, pero en realidad no. Por ejemplo, vamos a tomar estas variables para comprender lo que pasa:

a = la proposición “el viernes lloverá”

b = la proposición “el sábado hará buen tiempo”

ab = la proposición “el viernes lloverá y el sábado hará buen tiempo”

Ct = contenido (las consecuencias empíricas, su significado)

p = probabilidad

Pues, para Popper, una teoría es mejor si sus consecuencias empíricas son mayores, llevando a nivel de cálculo a una menor probabilidad:

$$Ct(a) \leq Ct(ab) \geq Ct(b)$$

$$\Downarrow$$

$$p(a) \geq p(ab) \leq p(b)$$

La probabilidad de que a ocurra tiene un porcentaje en principio, y la probabilidad de que b ocurra tendrá otro porcentaje. Cada una de estas proposiciones considerada sola y por sí misma tiene un porcentaje. Ahora bien, la teoría ab , que dice “el viernes lloverá y el sábado hará buen tiempo” tiene un mayor contenido (significado) que a y b solas. Sin embargo, la probabilidad de que *ambas* ocurran es *menor*.

¿Por qué este detalle es importante? Tomemos, por ejemplo, la teoría frecuencial de las probabilidades y apliquémosla a la gravedad. Si suelto un lápiz en medio del aire, éste debería moverse hacia el suelo. Trato una primera vez, y esto es lo que ocurre. Trato una segunda, una tercera, una cuarta vez, y ocurre exactamente lo mismo. Desde el punto de vista frecuencialista, mientras más ocurre un evento, más se verifica la teoría gravitacional de Newton. Sin embargo, ese procedimiento también verifica la teoría aristotélica de la gravedad.* Una teoría frecuencialista no me ayudaría en absoluto a decidir cuál teoría es mejor, si la de Aristóteles o la de Newton.

* Para Aristóteles, un objeto se mueve a su “estado natural”. Por ejemplo, los objetos sólidos, como el lápiz, se mueven a su estado natural que es el suelo.

Si nos fijamos en el contenido lógico (conexión de significados) de la teoría (el número de consecuencias empíricas), y nos acercamos desde una perspectiva lógica, sí podremos decidir mejor. Por ejemplo, utilizamos la navaja de Occam,* nos damos cuenta de que la teoría gravitacional de Newton puede explicar todos los fenómenos que la teoría aristotélica da cuenta, y mucho más: el movimiento de las mareas, las órbitas de los planetas, la órbita de la luna, la presión gravitacional, la cinemática, entre otros. A su vez, la teoría de Einstein puede explicar mejor que la de Newton, ya que da cuenta de todos los fenómenos explica Newton, y un poco más: el cambio Doppler, la segunda paradoja de los gemelos, la manera que la luz se afecta cerca de objetos masivos, y así por el estilo.

Aquí, pues, se le da la estocada final a la inducción como criterio para las ciencias:

- La inducción generaliza, ***pero no explica***.
- La inducción parte de la premisa que lo primero que ocurre es siempre la observación, y que la teoría científica se forja después. La realidad nos revela que es a la inversa: ***primero formamos unas teorías acerca del mundo, y son ellas las que determinan lo que debemos observar***.
- Las ***teorías*** son las que establecen los problemas científicos, y, basándonos en ellas, llevamos a cabo los experimentos, mediante los cuales llevamos a cabo las observaciones para resolverlos.

Nuevo Criterio de Demarcación: Ser Falsable

Como alternativa a la inducción, que es de por sí un mito, Popper ofrece el método de “conjeturas” y “refutaciones”. De acuerdo con él, toda hipótesis, teoría o ley científica es una conjetura postulada por un científico o la comunidad científica. El propósito de dichas conjeturas es *explicar* un fenómeno, cosa que nunca puede hacerse mediante la inducción. Una vez se conjetura, esta hipótesis, teoría o ley tiene que ser puesta a prueba (*tested*). ¿Cómo se pone a prueba una conjetura de este tipo? Mediante experimentos.

Por ejemplo, cuando se empezó a utilizar la teoría gravitacional de Newton, los científicos siguieron las leyes postuladas por ésta para predecir el movimientos de los planetas descubiertos

* El criterio de la navaja de Occam dice que debemos adoptar aquella teoría que explique el mayor número de consecuencias empíricas con la teoría más sencilla posible.

en esta época. Sin embargo, ellos se dieron cuenta que Saturno, el planeta más lejano conocido entonces, se movía de una manera irregular con respecto a las leyes de Newton. Los científicos predijeron que esto se debía a la existencia de otro planeta que todavía no era detectable por los telescopios de la época. Más adelante, tras escudriñar los firmamentos con mejores telescopios, se dieron cuenta de que **sí** existe ese planeta: Urano. Lo mismo ocurrió con Urano, su órbita no se conformaba con las leyes gravitacionales de Newton, así que postularon la existencia de otro planeta masivo más lejano del sol. Esto se corroboró en el siglo XIX con el descubrimiento de Neptuno.

Cada experimento, tanto mediante la observación del firmamento con un telescopio, como aquel que se lleva a cabo en el laboratorio, son intentos de refutar o **falsar** una hipótesis, teoría o ley científica, o un sistema teórico. Si el experimento refuta la conjetura en cuestión, entonces se dice que la teoría es **falsada**. Si la conjetura “sobrevive” a múltiples intentos de falsación o refutación, se dice que esa conjetura ha sido **corroborada**. Para Popper, “corroborado” sólo quiere decir que la hipótesis, teoría o ley sobrevivió a intentos de falsación. **Las teorías jamás se verifican**, no se pueden determinar de una vez y por todas si son verdaderas, sólo se pueden falsar.

A veces se tienden a añadir hipótesis *ad hoc* para salvar una conjetura. En tales casos, lo que hace esa hipótesis *ad hoc* es debilitar dicha conjetura en términos de la posibilidad de ser falsada. Si se añaden muchas hipótesis *ad hoc* a una teoría, se corre el peligro de convertir dicha teoría en una tesis **metafísica**, no una teoría científica. Si una tesis metafísica se presenta por alguien como una teoría científica, entonces se considera pseudociencia.

Ahora bien, siempre cabe la posibilidad de que una tesis metafísica se pueda convertir en una teoría científica. La demarcación entre ciencia y metafísica no es tajante e inquebrantable. Un ejemplo de ello fueron los átomos. Durante más de un milenio el atomismo no fue otra cosa que una teoría metafísica. Sin embargo, John Dalton formuló su teoría atómica como forma de resolver el problema de la calcinación de metales, y fue lo suficientemente precisa como para llevar a cabo experimentos en relación con su existencia. Otros científicos como Avogadro, Cannizaro, Thomson, Bohr, entre otros, siguieron elaborando esta teoría con altísimo nivel corroborativo. A pesar de todos los intentos genuinos de falsación, la teoría atómica se sostiene hoy firmemente.

¿Cuál Debe ser la Mejor Teoría Científica?

Para Popper, la mejor teoría científica siempre tendrá las siguientes características:

- La que sea **menos** probable desde el punto de vista de la lógica de las probabilidades.
- La que sea más corroborada y ha sido la que más ha “sobrevivido” a intentos de falsación.
- La que tenga mayor valor predictivo.
- La que se acerque más a la verdad debido a que explica el mayor número de fenómenos posible.

Notas Finales

1 Popper 1967, 72-73.

2 Popper 1967, 73-74.

3 Popper 1959, 93.

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Apéndice A



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Version 3, 29 June 2007

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