

Which Universal?

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D.A. Armstrong's account (1983, intimately influenced by Tooley 1977 and Swoyer 1982) of natural laws is that they are *relations between universals*. Armstrong doesn't simply hold that laws are some relationships or other between universals. He also holds that they are first-order universals themselves (1983, pp. 89-90). Each ordinary law—say, *causal* law—is numerically identical to some first-order universal. This is a striking, seemingly incredible hypothesis. What is Armstrong thinking of when he says (1983, p. 90):

I propose that the state of affairs, the law, $N(F,G)$, is a dyadic universal, that is, a relation, holding between states of affairs. Suppose that a particular object, a , is F , and so, because of the law $N(F,G)$, it, a , is also G . This state of affairs, an instantiation of the law, has the form Rab , where $R = N(F,G)$, $a = a$'s being F , and $b = b$'s being G :

$(N(F,G))(a$'s being F, b 's being $G)$.

Some states of affairs, for Armstrong, are *concrete* particulars; i.e., in addition to physical objects like my typewriter or the moon, there are also, for Armstrong, *particular* states of affairs (closely akin, if not identical to Barwise and Perry's (1983) "situations" and Davidson's (1980) "events", not to mention Kim's 1973). He says: "So we have a state of affairs of the form Rab , but where a and b are themselves states of affairs." (Also, p. 90) Thus, the universal that the complex state of affairs Rab is an instance of is proposed by Armstrong to simply BE the law. Now this is a bizarre and—I am sure to those uninitiated in my own theory of facts, propositions, and events (FPE Theory)—a VERY obscure proposal. Even before explicating it further (which I come to below), notice that the central presumption of a particular SUB-theory of FPE Theory—viz., what I call "complex event theory"—is already involved. This is the presumption that what I call "events"—including explicitly as "events" (using "events" broadly, that is) all sorts of non-momentary happenings such as processes, achievements, changings, situations, states, conditions, and (OF COURSE!) states of affairs—are typically complex, where by that I mean the typical event contains other events as proper parts or constituents. For example, the event of Oswald killing JFK contains, though is not exhausted by, the event of JFK's dying, and, more grandly, the state of affairs often thought of as the condition of peace (a condition exactly corresponding in event-hood to

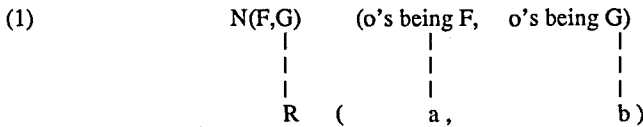
a war like WWII) from 1945 to 1985 in the US actually contained, ironically enough, such sub-events (or sub-states) as the Korean War, the Vietnam War, and several other violent military conflicts. (For details of FPE Theory, see Peterson 1979a, 1979b, 1979c, 1981b, 1982, 1985a, 1985b, 1986a, 1987b, 1987d, and Peterson & Wali 1985.)

But more than just the events part of FPE Theory is brought to attention by the above passages from Armstrong. One thing that followers of Chisholm might say on reading Armstrong is that Armstrong's states of affairs, like Chisholm's (1970), are a genus under which two rather different kinds of species fall—viz., propositions on the one hand (being states of affairs to which truth-values are ascribable), and events (as I *broadly* call them) on the other (which are candidates for being causes and effects, among other things). Then if one is also inclined to conflate laws themselves with *statements* of laws (not a mistake expected from Chisholmians so much as from positivists and post-positivistic skeptics like N. Cartwright), then one might take *another* interpretation (than that I have just given) for what Armstrong's Rab sort of states of affairs are. For since the symbol-string "Rab" is most ordinarily used as a representation for what can be expressed in a complete declarative sentence (schematically "a stands in relation R to b", e.g., "Alan is taller than Bill", for a = Alan, b = Bill, and "R" representing the relational predicate "is taller than"), perhaps Armstrong's *instantiation* of the law is simply the FACT that Rab. For example, let a's being G = Alan's being punished for hitting Mary, and where (say) "R" represents something like production, so that the state of affairs that Rab (trying to ignore Armstrong's symbolic barbarism of "a" representing both sub-state and individual in the state) is simply the *fact* that Alan's hitting Mary *produced* Alan's punishment. If we followed this line of explicating Armstrong, we could then say that the first-order universal which Armstrong takes to be a law which such a state of affairs (viz., a particular fact) instantiates is simply the PROPOSITION (i.e., one proposition among several others that are relevant) that hitting someone (F-ing) produces being-punished for it (G-ing). Then when the proposition in particular contains the special predicate of Armstrongian necessitation (what he represents with "N"), the proposition is a law (a law of the sort he is mainly considering, non-probabilistic and non-statistical). One reason for being led this way is that a common way to understand what a proposition is is as a limiting case of properties and relations—i.e., as the "intension" of a O-place predicate. Thus, if first-order properties and relations are first-order Aristotelian universals, then propositions in general—and so also those particular ones that are laws (i.e., laws = lawlike propositions)—are universals too (and even first-order: mainly by default, since they wouldn't be higher-order universals).

I strongly believe that this second way of trying to understand Armstrong's view of a law—where a species of fact "instantiates" (via making true) a particular sort of proposition (viz., that which is a law)—is absolutely wrong, even wrong-headed. The reason I sketched it, however, was to show that in addition to what I think is the right approach to understanding Armstrong (via complex event theory), there is another approach wherein facts and propositions are prominent and central. That is, even with regard to a very difficult point in Armstrong, all three items (such entities, and the concepts of them)—facts, propositions, and events (the latter broadly taken so as to *include* the states or conditions philosophers call "states of affairs")—are mentioned. FPE Theory is a linguistically influenced account of these three items (entity-wise and concept-wise). It is *not* an eliminationist theory (reducing two of the items or concepts to the remaining one, or reducing all to something else like particular physical objects or thoughts-and/or-ideas), though fully acknowledging the possibilities for *abstract* reductions via notational tricks is clearly a part of the theory (cf. Peterson 1982). Also, FPE Theory is a still developing theory. Even though there is strong foundation for the theory in the linguistic data and analyses which support asserting the *existence* of these basic kinds of entities (via the categoriality of the concepts of fact, proposition, and event) and for distinguishing facts from propositions and both of these from events,

there are still very basic problems to solved (such as how, VERY exactly, to individuate members of each of the three categories) and there are very many applications of the theory to be explored. (Indeed, the application of FPE Theory to laws as relations among universals is one of these important applications—and not the simplest, least subtle or difficult one either.)

With regard to what I called Armstrong's "basic proposal" above—viz., that a (schematic) law $N(F,G)$ is a relational universal, a relation holding between states of affairs—note, first, that " $N(F,G)$ " is a formal (or abbreviational) notation somehow representing, expressing, and/or referring to a law—the law slightly less schematically expressed by "It's a law that Fs are Gs" or even "All Fs are (i.e., by law are) Gs". Although "N" in the notation is predicative (representing "necessitates" for Armstrong), and "F" and "G"s are nominal (logical-subject-like), " $N(F,G)$ " is NOT propositional in form. The whole formula " $N(F,G)$ " actually plays the role of a *predicate*, rather like "W" playing the predicate role in the formula "Ws" when "s" abbreviates "Socrates" and the whole abbreviates "Socrates is wise". So, Armstrong has set up an association like the following:



Both strings of (1) represent *propositions*. Stated in the dialect of such notations, the first line represents the proposition that o's being F stands in a certain relation (viz., that represented by " $N(F,G)$ ") to o's being G and the second line represents the proposition that a stands in relation R to b. That is, " $N(F,G)$ " is a *predicate* (relational) with arguments that are expressions referring to events or states. Applying FPE Theory here, an *instance* of the law (a universal) is a certain complex event (or complex state or condition, a state of affairs), the event of a *being* R to b. This is an event containing proper sub-events, since a is an event (say, the event or state of o being F) as is b (say, the event or state of o being G). To make the example temporarily easier, think of the particular *complex* event in question as a *causation*—i.e., (a's being R to b) = (event-a *causing* event-b). Then Armstrong's idea is that the particular event or state of a *causing* b is an instance of a universal—a universal which is the law in question.

To clarify Armstrong's proposal, the FPE Theory notation for cases and kinds of events and states must be introduced. Following Peterson 1985b, 1985a, and 1979b, Davidson's notation (though not his whole theory) is used to represent event (and state) *kinds*. Thus, if " $F(o)$ " represents the proposition that "Oscar is humble" (i.e., " o " = "Oscar", and " $F(\dots)$ " = "... is humble"), then " $F(o,t,x)$ " represents the proposition that x is Oscar's *being* humble at t. That is, Davidson's " $(Ex)(F(o,t,x))$ "—which he takes as the logical form of "Oscar is humble at t"—is read in FPE Theory as "There is an event (here a state) of Oscar being humble at t". (I omit herein all the interesting considerations about times and "t", and will just insert and omit "t" without explanation.) Thus, the predicate " $F(o,t,\dots)$ " is an event-kind predicate—representing (qua predicate) the event-kind of Oscar-being-humble at t (whether or not there is in fact a *case* of this kind). If Oscar IS humble at t, then the event of Oscar being humble at t actually exists (occurs, or obtains). That particular event is, then, a case of the *kind* of event of Oscar being humble at t. It is also a case of *other* kinds of events (event-kinds), e.g., a case of someone or other being humble at t, and a case of Oscar having some kind of virtue at t. With this notation, we can say that a above is simply (using the same example) the particular event which is a *case* of Oscar being humble at t; i.e.,

$$(2) \quad a = (ix)(F(\delta,t,x)) \quad ("i" \text{ represents Russell's iota})$$

Now the same goes for b (letting "G(o)" = "Oscar has heartburn"):

$$(3) \quad b = (iy)(G(o,t,y)) \quad (\text{read "b = Oscar's having heartburn at t"})$$

Above I said that there is a *complex* event of a-R-ing-b (say, a *causing* b) (say, Oscar's being humble at t causing him to have heartburn at t). This complex event is, in turn, a case of a kind (indeed, or very many kinds, e.g., of one event *causing* another). Let the particular event of a-R-ing-b (a complex event) be temporarily referred to by "c". Then:

$$(4) \quad c = (iw)R(a,b,t,w) \quad (\text{read: "c = (the event of) a R-ing b at t"})$$

But c, of course, contains a and b and so is rather complicated (when the definite descriptions for a and b are inserted). Now c, then, is a case of an event-kind, most determinately the kind represented by the predicate "R(a,b,t,...)" (read: "... is an R-ing by a, of b, at t"). Is this event-kind (a universal, since a kind) what the *law* (universal) N(F,G) is? That is, is "N(F,G) = x[R(a,b,t,x)]" true? (I use Quine's notation for attribute and relation abstraction.) No. First the respective number of arguments for the format is wrong. If we are identify what the abstracted predicate on the right *refers* to (viz., an event-kind derived from a one-place event-kind predicate) with what "N(F,G)" supposedly represents, then the latter must similarly undergo abstraction notationally. Since Armstrong takes "N(F,G)" to be a two-place relational predicate (in the quotation above), the abstracted form is required; i.e., the relation itself must be referred to (following Quine still) by "xy[N(F,G)(x,y)]". That is, the question concerns the truth of

$$(5) \quad xy[N(F,G)(x,y)] = x[R(a,b,t,x)]$$

We can see this isn't even a candidate for a truth, since no two-place relation is ever identical to a one-place attribute. Thus, we can conclude that the (most determinate) event-kind of which c is a case *cannot* be the universal that Armstrong has in mind as being the law c (possibly) instantiates.

Recalling Armstrong's notion of quasi-universals (1983, p. 100) helps us to see which way to go here. Quasi-universals have particulars "in" them (so to speak). Being humble is a universal, being more humble than *Socrates* is a *quasi*-universal according to Armstrong. Being more humble than some famous philosopher, however, is *not* a quasi-universal since no particular (non-universal) is contained in it. If the law N(F,G) IS a genuine, *non*-quasi universal, then no particulars are contained in it. But the universal x[R(a,b,t,x)] is multiply-quasi. For not only are a and b particulars (particular events or states), but *in* each are further particulars (viz., the non-event that is Oscar). What we have to do is, first, get the number of argument-places right (vs. (5)) and, second, purify (via appropriate abstractions and quantifications) the universal of "quasi-ness" (so to speak). To make a long story shorter, the purification of the right-hand side of (5) is

$$(6) \quad w[(\text{Eu})(\text{Ev})(\text{Ex})(\text{F}(u,t,x) \ \& \ (\text{Ey})(\text{G}(v,t,y) \ \& \ \text{R}(x,y,t,w)))]$$

This is read "the event (state)-kind of an R-ing by some F-ing (by some u at t) of a G-ing (by some v at t) at t". (6) is a singular term (via abstraction) for a particular kind of event (or event-kind). The predicate embedded in the outermost brackets of (6) is read "w is an R-ing by some F-ing (by something u at t) of some G-ing (by something v at t) at t". (I presume the latter is a one-place (very complicated) predicate by pretending that "t" this time *names* a time. To remove this source of quasi-ness would, of course, require an additional quantifier.) Using the examples introduced just above for "R", "F", and "G", this predicate is read "w is a causation (at t) by something being humble (at t) of something having heartburn (at t)". The universal referred to by (6) still cannot

be Armstrong's law (qua universal), since he says the law is a *relation* (and no relation of any sort is identical to a non-relational property, for logical reasons). So, the challenge is to produce a relation on the basis of (6) which is a genuine candidate for being an explication of Armstrong's (schematic) natural law. The answer is to de-Davidsonize the predicate "R" embedded in (6). "R" is a four-place predicate—in particular "R(m,n,t,w)". It is an event-kind predicate derived from "R", where (disregarding "t") the latter (in detail) is "R(m,n)"—read "m is R to n" (or even "m Rs n", e.g., "m causes n"). Then the resulting universal including "F" and "G" components is:

$$(7) \quad xy[(Eu)(Ev)F(u,t,x) \ \& \ G(v,t,y) \ \& \ R(x,y)]$$

That is, the singular term in (7) doesn't just refer to the relation of R-ing itself but rather to R-ing by an F-ing of a G-ing. We might define "R'(x,y)" as follows:

$$(8) \quad "R'(x,y) = \text{df. } (Eu)(Ev)(F(u,t,x) \ \& \ G(v,t,y) \ \& \ R(x,y))"$$

Now, finally, we have a relationship (qua universal) which Armstrong's N(F,G) could be identified with—i.e., what "xy[N(F,G)(x,y)]" could be referring to. It is simply xy[R'(x,y)], the relation itself (a universal) of being R'—where *that*, in turn via (8), is being-R-by-an-F-ing-of-a-G-ing. To understand (6) and (7) more clearly, reconsider the interpretations of "F" and "G" (and their Davidsonized correlates) used above, where we revise "R" to be "necessitates" (as Armstrong prefers over "causes"). Then (6) refers to the event-kind of being a being-humble (a state of that type) necessitating a having-of-heartburn (a state of that type). And (7) refers to the relation itself (in abstraction) of necessitating between a being-humble (sort of state) and a having-of-heartburn (sort of state). That is, in this (very oversimplified) illustration, the law N(F,G) in question is the law that being humble is (by law) having heartburn, where any instance of that law is the pair of *particular* events or states of someone's being humble and someone's having heartburn. (Note that I have omitted from consideration above the requirement that it be the same individual.)

A particular state (event, process, etc.) cannot literally be an instance of a law, if a law is a *relational* universal, since a (so-called) instance of a relation (say, a two-place one) must be *two* things—or better, an ordered pair. Thus, an ordered pair such as $\langle a,b \rangle$ above—not taking typical set-theoretical definitions of it (since then the pair would be abstract, since a set, where what is needed here is a *concrete* pair, the pair of particular states or events)—could be an instance of the law N(F,G) when the latter is (as I contend is the correct explication of Armstrong's concept of law) a relation in itself. So, Armstrong's view produces the difficulty of having to *say* a particular event or state is an instance of a law, where what one really means is that an ordered pair of such particular states is what the law "covers". This infelicity is sufficient for me to propose amending Armstrong's theory (of natural laws as relationships among universals) so that rather than being relations (*qua* universals), they are complicated event-kinds which particular complex events are cases of; i.e., take Armstrong's law N(F,G) to be (6), *rather than* (7).

IS Armstrong's law *qua* first-order universal what (6) would refer to? Or what (7) would refer to? Or is it some other universal? Such questions must be answered *before* (or in concert with) any further development of his account—such developments as concern (i) the necessity and contingency of laws, (ii) necessary connections in events and laws, (iii) the ontology of laws, (iv) naturalism (Armstrong's or otherwise), (v) necessitation *via a vis* causation, and (vi) explanations as relationships among facts. IF such developments are achieved, the resulting clarified (perhaps modified) Armstrongian account of natural laws will be *very* useful in further explicating the something that is right (far from everything, cf. Hempel 1965, 1970) about "covering law explanations" (e.g., utilizing causal laws) conceived of, to begin with, as the

deductive-nomological model would have it (but *redeveloped* by acknowledging Salmon's 1984 criticisms and utilizing his proposals about underlying causal mechanisms).

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