Offspring Gamete Frequencies

In class, we derived a recursion for the frequency of AB gametes from one generation to the next (see Handout I.3 and p. I-10 of the Coarse Notes):

$$P'_{AB} = P_{AB} - rD \; .$$

This was enough to compute the disequlibrium in the offspring generation but I also may have mentioned that the other gamete frequencies among the offspring could be computed similarly to P'_{AB}. Those formulas are:

$$P'_{aB} = P_{aB} + rD$$
$$P'_{Ab} = P_{Ab} + rD$$
$$P'_{ab} = P_{ab} - rD$$

Notice that

$$P'_{AB} + P'_{aB} + P'_{Ab} + P'_{ab} = \left(P_{AB} - rD\right) + \left(P_{aB} + rD\right) + \left(P_{Ab} + rD\right) + \left(P_{ab} - rD\right)$$
$$= P_{AB} + P_{aB} + P_{Ab} + P_{ab} - rD + rD + rD - rD$$
$$= P_{AB} + P_{aB} + P_{Ab} + P_{ab}$$
$$= 1$$

as it should since all the gamete frequencies must add to 1 every generation.