Transplication as Implication

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In his contribution on partial logic to the *Handbook of Philosophical Logic* [1], Stephen Blamey introduces a 'value gap introducing' connective named 'transplication' (/) to the standard 3-valued partial logic, the *Strong Kleene logic*. Where t stands for 'true', f stands for 'false' and n stands for 'neither true nor false', the truth table for this connective is:

/	1	n	0
1	1	n	0
n	n	n	n
0	n	n	n

Blamey suggests the possibility of reading the transplication connective as a type of conditional. Basically, the idea is that conditional sentences of the form 'if A then B' are neither true nor false when A is false. They are also neither true nor false when either A or B is neither true nor false. I was interested to see how the transplication connective fares as a conditional by testing it against a list of inferences concerning conditionals. Here are the results:

(1) $q \vDash p/q$	×
(2) $\neg p \vDash p/q$	×
(3) $(p \wedge q)/r \vDash (p/r) \vee (q/r)$	√
(4) $(p/q) \wedge (r/s) \vDash (p/s) \vee (r/q)$	√
(5) $\neg(p/q) \vDash p$	√
(6) $p/r \vDash (p \wedge q)/r$	×
(7) $p/q, q/r \vDash p/r$	√
(8) $p/q \vDash \neg q/\neg p$	×
(9) $\vDash p/(q \vee \neg q)$	×
(10) $\vDash (p \wedge \neg p)/q$	×

Paraconsistent Transplication

What would the transplication connective look like when added to the 3-valued *LP* (Logic of Paradox), which treats the third truth value b as both true and false. Well, to begin with, application of the transplication connective's behaviour to the truth value b forces a step outside of the 3-valued system into a 4-valued system, with truth values n (again neither true nor false) plus b. This transplication connective thus finds a home in the many-valued logic *FDE* (First Degree Entailment) system. The truth table for this connective is:

/	1	b	n	0
1	1	b	n	0
b	1	b	n	0
n	n	n	n	n
0	n	n	n	n

Here are the results for the transplication connective based on the logic *FDE*, which turns out to be the same as that for the transplication connective based on *Strong Kleene logic*:

(1) $q \models p/q$	$\times$
(2) $\neg p \models p/q$	$\times$
(3) $(p \wedge q)/r \models (p/r) \vee (q/r)$	$\surd$
(4) $(p/q) \wedge (r/s) \models (p/s) \vee (r/q)$	$\surd$
(5) $\neg(p/q) \models p$	$\surd$
(6) $p/r \models (p \wedge q)/r$	$\times$
(7) $p/q, q/r \models p/r$	$\surd$
(8) $p/q \models \neg q/\neg p$	$\times$
(9) $\models p/(q \vee \neg q)$	$\times$
(10) $\models (p \wedge \neg p)/q$	$\times$

References

[1] Blamey, Stephen. 'Partial Logic', In D. Gabbay and F. Guenthner, (eds.). *Handbook of Philosophical Logic Volume III*. Dordrecht, D. Reidel Publishing Company, 1986, pp. 1-70.