I: degradable by the degrading map $p$.

$V_i = \text{iso ext of degrading map } p$.

Texts $N$: (say $S \circ T_i = N_1$, $W = \text{iso ext of } S_1$).

$B$ a cause output as $\overline{N}$. 
Finally, apply Theorem 2 to $T$:

$$Q^{(1)}(\overline{T}) = Q(T) \leq p_1 Q^{(1)}(\overline{T}_1) + p_2 Q^{(1)}(\overline{T}_2)$$

By Theorem 1, $Q(N) \leq Q^{(u)}(T)$

$$Q\left(p N_0 + (1-p) N_1 \right) \leq p Q^{(1)}(\overline{T}_0) + (1-p) Q^{(1)}(\overline{T}_1)$$

This is deg α + of $N_\overline{\cdot}$
For the teleporting channel:

Consider the teleport channel \( N(p) = (1-p) I + p Z \).

Let \( U_i U_i^+ = X \), \( U_i Y U_i^+ = Y \), \( U_i Y U_i^+ = Z \).

Then the teleporting channel:

\[
N_p = \frac{1}{3} N + \frac{1}{3} U_i \circ N \circ U_i^+ + \frac{1}{3} U_i \circ N \circ U_i^+.
\]

\( U_i \circ N \circ U_i^+ \) defflating with \( X \) defflating with \( X \) defflating with \( Y \).

Each of \( N, U_i \circ N \circ U_i^+, U_i \circ N \circ U_i^+ \) degradable.

\( Q^{(n)} \) of each \( N = 1 - H(p) \).
2. $\Phi(N_p) \leq 1 - H(p)$

(a) recovering Rain's book

(b) the upper for each $N_p$ comes from a deg extension

2. Repeat above w/ $N_1(p) = \text{amplitude damping channel}$

\[
\Phi(N_p) \leq H\left(\frac{1-Y}{2}\right) - H\left(\frac{Y}{2}\right)
\]

where $Y = 4 \sqrt{1-p} (1-\sqrt{1-p})$ (A3)
③ Consider \( N_p = (1 - 4p)I + 4p \, N_{\frac{1}{4}} \) \( (p \in [0, \frac{1}{4}]) \)

Both \( I \) & \( N_{\frac{1}{4}} \) have additive ext
\[ \text{[trivial for } I \text{, and use Thm 3 for } N_{\frac{1}{4}} \text{]} \]
& the fact it is known to be anti-degenerate

2. Thm 4 applies &
\( Q(N_p) \leq (1 - 4p) \cdot 1 + 4p \cdot 0 = 1 - 4p \)

(a) recovering Rin's 6th, (b) each \( N_p \) less deg
ext giving the 6th
Putting every thing together:

Let $f(p) = \max \text{ convex func }$ upper bounded by

$$1 - H(p), \quad 1 - 4p, \quad H\left(\frac{1-y}{2}\right) - H\left(\frac{x}{2}\right)$$

due to thm 4. & that every thing’s derived

from a deg qnt, $Q_N \leq f(p)$