Exercise 1 (A variant of Reiter)
Let $G$ be a group acting on a set $X$. Prove that the following condition is equivalent to (R2):

For every $S \subseteq I \subseteq G$ and every $\varepsilon > 0$ there is $v \in \ell^2(X)$ with

$$\left\| \frac{1}{|S|} \sum_{s \in S} sv \right\|_2 > (1 - \varepsilon)\|v\|_2.$$

Optional questions:
- Harder: how about the above condition but with $\| \cdot \|_p$ for a general $p > 1$?
- Easier: and how about $p = 1$?

Exercise 2
Let $G$ be a group acting on a set $X$ and let $A, B \subseteq X$.

(i) Suppose that there is a piecewise-$G$ surjection $A \to B$. Prove that there is a piecewise-$G$ injection $B \to A$.

(ii) Show that the converse does not hold.