# A 4D model of training in relationship with a 5D model of personality

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Most personal trainers and coaches will adjust the resistance training program based on their clients preference. It will most likely be done through asking questions and through trial and error. Others will use an unconventional method to assess what a specific client will prefer called *"Neurotyping"*, which is quite popular among fitness enthusiasts and personal trainers. Basically, it is a survey based test that tells you your "neurotype". A neurotype is one's predominance in a certain neurotransmitter or a higher sensitivity to one. The obvious problems with this approach are that (a) there are currently no known methods to accurately assess neurotransmitter dominance with a survey and (b) the level of a neurotransmitter changes with time. Also, (c) neuroscientists won't judge someone's personality with neurotyping, because of the two previous reasons and the simple fact that reducing personality traits to neurotransmitters is currently impossible, and probably always will be. Measuring neural circuit activation (which are influenced by neurotransmitters and neuromodulators) is most likely the next step in making predictions of someone's likes and dislikes, and future behaviors.

Currently, the most scientifically rigid method to assess personality is the *"Big-Five personality traits"* model. It is higher in terms of abstraction, but much more accurate and stable[1] than any other known method. The five dimensions are extraversion, agreeableness, openness, conscientiousness and neuroticism.

The [four dimensional](#) model of resistance training is attained with a reduction of the training variables to physics. It is a descriptive model that uses three dimensions of space and one of time to make an accurate description of a resistance training program.

## Linking the two

To make a useful bridge between personality and resistance training, the recommendations that will come out will have to be subtler than "do X training style". The reason is that, for instance, asking an olympic weightlifter to mostly do yoga and slow movement is counterproductive, even if he is prone to stress. It is a necessity to keep the main goal in mind.

Recommendations should therefore be about something of seemingly low importance. As an example, people low in openness might prefer if it is written "Rest

90 seconds inbetween sets", but someone high in openness will maybe favor "Rest enough so that you partially recover, but don't take more than 2 minutes". The difference in training stimulus will be extremely low, or non-existent, but their adherence to the plan might increase drastically.

## Implementation

Creating a technology that can adjust its recommendation based on the underlying physics of resistance training, periodization *and* personality — with the Big Five model — would be a major step towards better gym related practices. To collect the necessary information to assess personality traits a survey is currently the best approach, but using pictures might one day become the simplest, and yet, effective approach.[2]

For someone who is high in **extraversion**, replacing a coach with technology might be an inadequate approach. It might lower their adherence to the training regiment since being with someone else while resistance training or talking to someone once a week is a major factor in their constancy. However, if that person can meet their social needs outside of the gym, this technology might not be a problem. The software system should adapt to extraversion by increasing the frequency of "check-ins" with the virtual coach.

## Recommendations

For anyone who is low in **agreeableness**, the virtual trainer should explain every decision, or at least leave the choice for the user to read the explanation. It should also ask a lot of questions while creating the athlete's profile to give more control to the user. For someone who is high in **neuroticism**, it needs to find a way to reward the user more often, while giving them autonomy.[3] It might be by making recommendations on goal setting. I also don't think that the training program recommended by the virtual coach should be extremely precise, in case that the person feels like he or she failed, because of "non-compliance". For instance, taking 2 minutes in between sets instead of 90 seconds. Also, to give a sense of subjective success, the software should be just strict enough while looking at the exercise being performed from a space only perspective. Meaning that the force vector should be aligned with the targeted muscle so that the user actually *feels* the appropriate muscle. The time dimension should less be taken into account, since it could be sensed as being invasive, and sometimes changing the velocity can help with the appreciation of a particular movement. For someone high in **openness**, leaving room for exploration is a must. The virtual trainer should therefore intervene only when necessary, while analysing the exercise mechanics and also while creating a program. For every exercise in the program, it should give at least two options. The options should be selected for their similarity in terms of the resistance profile. If

there is a lack of possibility, it should make adjustments in the time dimension, so that the outcome of the exercise stays the same. On the other hand, someone who is low in openness will probably prefer a training routine with less variations and changes. When a change will be needed, the least drastic approach is to be prefered. That's why simply using the 4D model is a good idea, a simple change in tempo, for example, could sufficiently modify the stimulus. For someone high in **conscientiousness**, setting a plan with goals is a must. Compared with high neuroticism, the goals can be highly based on performance and the preciseness is a little bit less important.[4] People low in conscientiousness might have better results with a detailed plan, highly precise goals and a tighter, more frequent follow-up. Since low conscientiousness is associated with acting without planning, the training program should be built so that it is okay to change the time allocated to training at the last minute, while being able to continue to achieve goals. This is where making changes in the time dimension and the resistance profiles could be important, to save time achieving a particular outcome. Also, it would be important in this scenario to keep a tight focus on the second dimension of space, so that the user gets the most tension out of every rep.

## Conclusion

Making resistance training and personality traits entirely computable will make creating an efficacious virtual trainer possible. Linking the two will increase adherence, since the training regimens will be personalised.

## Citations

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