

A Theory of Revision

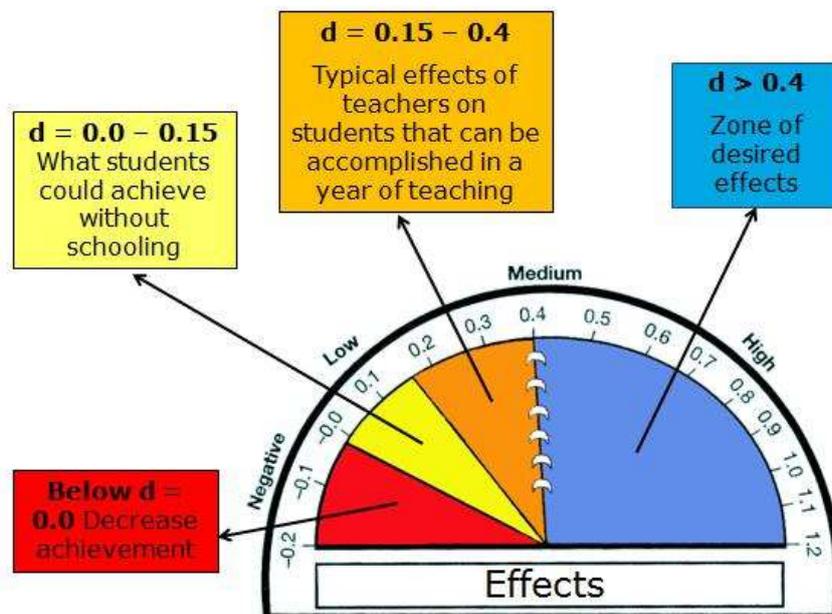
John Hattie

- John Hattie has been Director of the Melbourne Educational Research Institute at the University of Melbourne, Australia, since March 2011.
- Before, he was Project Director of asTTle and Professor of Education at the University of Auckland, New Zealand.
- He holds a PhD from the University of Toronto, Canada.
- 'Visible Learning' is a synthesis of more than **50,000 studies** covering more than **80 million pupils**.

Effect Sizes

- Hattie uses the statistical measure of effect size to compare the impact of many influences on students' achievement, e.g. class size, holidays, feedback, and learning strategies.
- An effect size of **1.0** is analogous to a **two grade leap at GCSE**
- An effect size of **0.5** is analogous to a **one grade leap**.
- An effect size of $d=0.2$ may be judged to have a small effect, $d=0.4$ a medium effect and $d=0.6$ a large effect on outcomes.
- He defines $d=0.4$ to be the *hinge point*, an effect size at which an initiative can be said to be having a 'greater than average influence' on achievement.

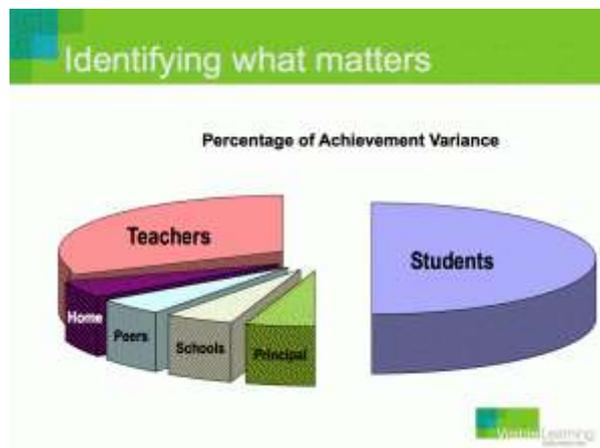
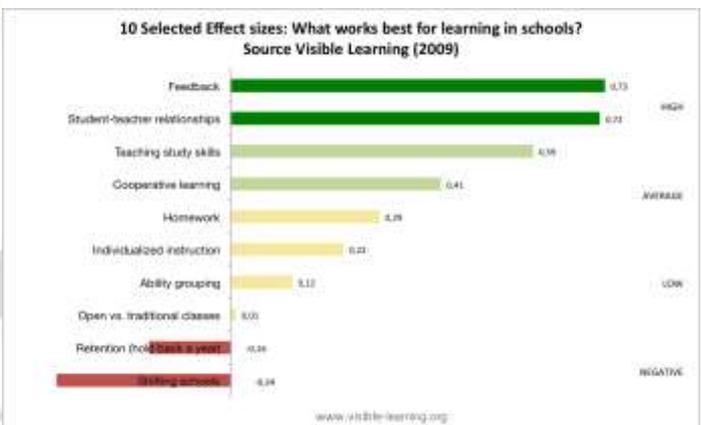
Barometers of Influence



Ranking Effect Sizes

1. High expectations
2. Feedback
3. Teacher-student relationships
4. Attribution (teaching students to attribute the quality of work to factors over which they have control – e.g. study time, the use of appropriate strategies and NOT to attribute it to fixed attributes over which they have no control such as talent, IQ, prior learning etc.)
5. Teaching study skills
6. Metacognition (*learning about learning*)
7. Homework
8. Testing
9. Finances/money (school)
10. Class size

HIGH INFLUENCES	Effect Size
How to develop high expectations for each student	1.44
Providing formative evaluation to teachers	0.90
Classroom discussion	0.82
How to provide better feedback	0.75
Teacher- student relationships	0.72
How to better teach meta- cognitive strategies	0.69
Vocabulary programs	0.67
How to accelerate learning	0.68
Teaching Study Skills	0.63
Teaching learning strategies	0.62
Ways to stop labelling students	0.61
Comprehension programs	0.60



Delving a bit deeper

Attribution (Mean effect size 0.96 to 1.42!!)

This involves teaching students to attribute the quality of their work to factors over which they have control such as: effort, study time, and the use of appropriate strategies, and not to attribute the quality of their work to fixed attributes over which they have no control such as talent, ability, prior learning, or IQ. Clearly, if a struggling student attributes their weakness to IQ then they are likely to despair and withdraw effort. If they attribute their weaknesses to lack of effort, then they may actually do something about it!

The 1.42 effect size is enormous, and is for within subject specific programmes, the 0.96 is for 'transfer' between programmes.

Structural Aids (Mean effect size 0.58)

These are strategies that show the **structure of what is being learned**. It **involves interacting with content to develop ideas on its meaning**, for example extracting the key points from the content being studied. Such strategies include: '**Concept mapping**' (or mind mapping, spider diagrams etc); 'advanced organisers' where students are told in advance what they will learn in a lesson or unit; note taking skills; summary writing etc. Teaching students to work up the Biggs SOLO hierarchy may also help.

Effect sizes are additive, so if students learned 'attribution' and 'structural aids' effectively this would add three grades to each student's academic performance! In practice it is hard to implement strategies as rigorously as on educational research programmes. However, the very large effect sizes for these strategies show that there is plenty of opportunity to improve student learning.

Memory Aids such as Mnemonics (Mean effect size 1.09)

For example Richard of York Gained Battle In Vain to remember the colours of the rainbow: Red Orange etc. The high effect size is partly due to the limited measure of success (rote recall).

More about the study skills meta-study

- Most study skills teaching has a positive effect, but some works much better than others. The mean effect size of studies was about 0.45. Study skills teaching improved attitude more than it did the students' study skills (0.48). Perhaps it makes students feel less stressed!
- Although other strategies can work well, **the best strategy is to teach study skills in context**. Only exceptionally will students 'transfer' strategies learned in one context, into another. So if an economics teacher teaches essay planning, the students benefit and their essays get at least a grade better, but they need to be taught by their history teacher to transfer these skills to, say, history essay planning which otherwise will not improve!
- It's best to use tasks that are real, embedded, and subject specific. e.g. Teach essay planning while they are writing a real essay for their course; or teach note taking by looking at the notes they have made in a real lesson.
- Its best to integrate study skills teaching into the scheme of work.
- **Students must be active while they are learning study skills**. Giving notes on how best to study doesn't work.
- **Meta-cognition** is a notable feature of all the successful (high effect size) studies that they found. **Meta-cognition is students thinking about their learning, and self-regulating their own learning**. For example, students reflecting about the way they work, and so setting themselves goals for improvement, then evaluating how this went.
- Students are required to **self-monitor, self-assess, and self-regulate** their use of these skills, setting themselves targets for experimentation and improvement. This is called 'meta-cognition' and is given a heavy emphasis in this review. The effect sizes of strategies that require meta-cognition are nearly twice as high as those that do not.
- In the very best programmes students are asked to generalise what they have learned about study skills to other aspects of their study. For example "Its always important to keep in mind what the key points are when studying a topic" "You forget if you don't review and it its best to review often for short periods than rarely for long periods" etc.

Planning

Use the planning tools on SharePoint to help you plan effectively.

- It helps you cover what you need to in the time you have
- It allows you to prioritise subjects that need more revision
- It motivates you to use your time effectively
- But set up specific times in the day/week just to study primes your brain by setting up a routine (and over time, studying actually becomes easier as your brain is trained to work in those moments)
- Do not work all day, every day. Work 2/3 sessions. You must build in time off
- It sparks your motivation
- Once your revision timetable is up on your wall, you just have to follow it. Simple!

Don't 'pull' prolonged nocturnal study sessions

- After these, reasoning and memory may be negatively affected for up to 4 days.

Have a specific goal for each study session - set a goal and manage your time to meet these targets

An analogy....

- When you play football/hockey, there are goals on either side of the field; you are constantly working throughout the whole game to score a goal.
- You have to push through constantly
- There will be/are setbacks that whole time
- Lots of games are a draw or you lose but you do not give up; you carry on endeavouring to score a goal

The most efficient study sessions

1. Small, short chunks

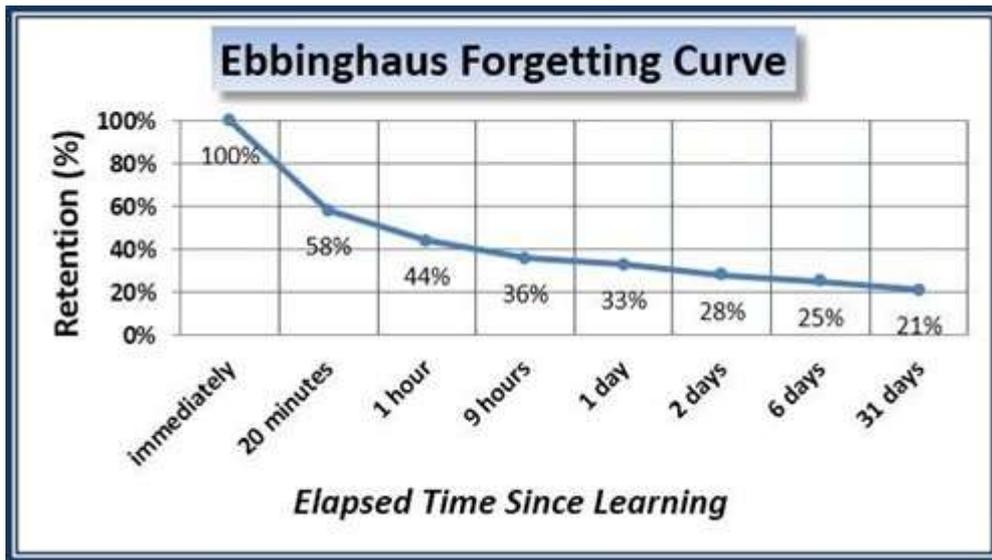


- The brain is much better at encoding information into the synapses in short repeated sessions as opposed to one large one
- Don't do a ten hour study session, but twenty 30 – minute sessions over a few weeks. Think tennis, piano, swimming lessons
- And keep to a routine

2. Study often



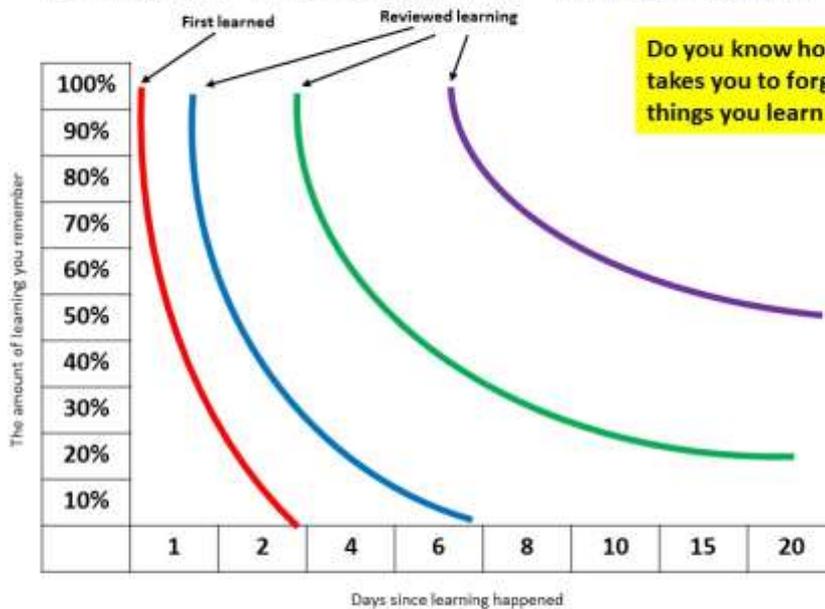
Herman Ebbinghaus' Forgetting curve



- Within an hour, more than half is gone, within 24 hours; two-thirds – memory degrades
- BUT we can help keep information live longer in our brains by bringing it back to mind – by retrieving it

Did you know....

Ebbinghaus' Forgetting Curve - The Spacing Effect



Do you know how long it takes you to forget the things you learn in lesson?

- After studying it a second time, the curve flattens out at a higher level. If we repeat the process of learning a third time, the curve shifts again and our LTM includes an even greater percentage of the content
- Each time you review (at key times), you strengthen the neural connections/the memory until they become well established

Retrieval

- Is the stage of learning when we reach into our long term memory to pull facts back into consciousness – back into the working memory.
- When we recall information, we send signals through networks of neurons we've formed, through pathways that have been forged throughout the brain.
- Like a desert, water runs across the sand, travelling in paths and rivulets it has previously carved, both revisiting (remembering) them and deepening them, making them easier to access the next time (retrieval)



3. Multi-sensory

- The previous mantra has been that your revision should reflect learning style - visual should be colourful, diagrammatic, with notes, posters and mind maps, auditory should be chants, raps and songs etc. and that you should figure out how you learn (taking an online VARK profile).
- And although we all do have an area/areas in which we are stronger ...



- Examinations test meaning not sense. They test concepts not what something looks or sounds like. Re-reading and re-writing will not help a student to understand something. In order to retain something, we have to organize it in a way which is meaningful. We have to

make connections to it, experience it, relate it to what we already know. It is stored as meaning (not limited to particular sensory modes).

- <https://www.youtube.com/watch?v=855Now8h5Rs> (from 5.19)

Tell Us What Birds You See

 BLACKBIRD Seen Heard	 HISTLETHRUSH Seen Heard
 BLUE TIT Seen Heard	 ROBIN Seen Heard
 HOUSE SPARROW Seen Heard	 LONG TAILED TIT Seen Heard
 GREENFINCH Seen Heard	 LINNET Seen Heard
 CUCKOO Seen Heard	 COLLARED DOVE Seen Heard
 GREAT TIT Seen Heard	 YELLOW WAGTAIL Seen Heard
 BULLFINCH Seen Heard	 DUNCOCK Seen Heard
 GREEN WOODPECKER Seen Heard	 GOLDFINCH Seen Heard
 LESSER REDPOLL Seen Heard	 TREE SPARROW Seen Heard
 CHIFFCHAFF Seen Heard	 WREN Seen Heard
 SWALLOW Seen Heard	 SKYLARK Seen Heard
 YELLOWHAMMER Seen Heard	 SONG THRUSH Seen Heard

LONGBIRD SURVIVAL Charity No: 119033 www.longbird.org.uk PO Box 311 Old Humble Pie WNV dave@longbird.org.uk

- The best way to learn something depends on content itself. If I want to teach what songbirds look like, the best way is to show the pupils the birds themselves. But this is true for everyone not just visual learners. If I want to teach what they sound like, I would let the students hear, if I wanted to teach what flowers smelt like I would let students experience it by letting them smell as this is the best way to do it, not because they are olfactory learners!
- In fact the best way to teach/learn is by using **MULTIPLE SENSES**.

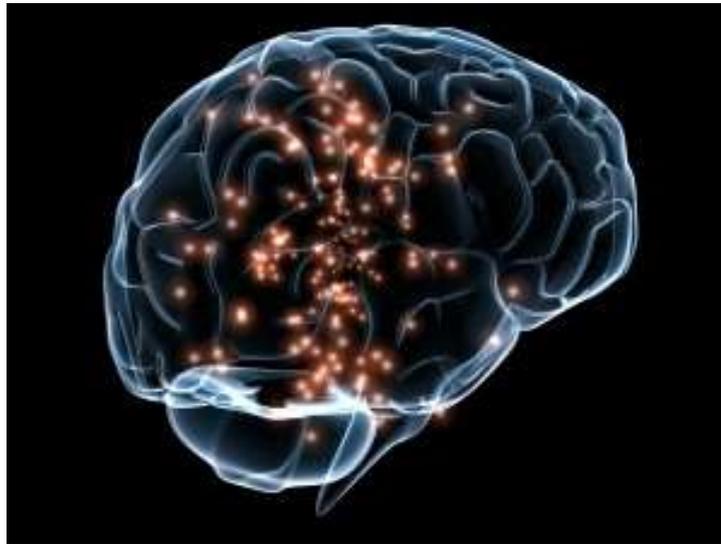
Cone of Learning (Edgar Dale)



Edgar Dale, Audio-Visual Methods in Technology; Holt, Rinehart and Winston.

- When learning how to football, the best way is to actually practice but students would also benefit from watching others play, studying schemes of positions, watching others being coached and listening to the coach whilst playing.
- **So – be careful!** Learning as a certain type of 'learner' can be dangerous. If you only learn in one way, it might prevent you from trying new strategies. It is all too easy to shut down and lose interest when not doing something in your preferred style. If you shut down, you run the risk of failure because you gave up not because you can't learn it.
- We are all capable of learning in variety of ways.
- We need to use metacognition - thinking about thinking, learning about learning

4. Revise actively



Active Learning Strategies	Passive Learning Strategies
Reading aloud	Re-reading silently
Summarising notes onto cards	Copying notes out
Create a mind map	Highlighting/underlining key points
Linking ideas/information - hexagons	Writing down ideas/info.
Questioning theories/ideas	Copying theories/ideas
Doing past exam papers	Typing notes up on a PC
Vocalise EVERYTHING as you're working as it aids memory	

- Active learning strategies involve using more than one part of your brain and therefore encourage the brain to remember information for longer
- The key to effective revision is doing something with the information you are trying to learn
- Where possible, mix it up but use metacognition to work out which strategies are best for which subject area/topic.

Ways of revising

- Acronyms
- Mind mapping
- Pictures/big flip-chart sheets/posters with key points. Display them on walls (where you will see them regularly)
- Revision aids around the house – especially for 'rote learning' – MFL verbs, grammar, mathematical formulae – read them when on the loo/in the shower/having breakfast
- Record yourself – 10 key points about a topic – play them back in the car/running/walking/travelling etc.
- Highlight key areas in notes/books, picking out key points
- Listen to tapes of books and discuss with others
- Watch revision DVDs and make notes (pausing when you need to) – test yourself afterwards – or make your own one!
- Read page, shut book and then test yourself. What can you remember?
- Tell someone what you have learned
- Mnemonics
- Get friends/family to test you
- Picture Stories
- Teach someone else
- Create a wiki or a document where you become the expert/explaining it to people
- Make podcast

5. Teach it!

'The best way to learn is to teach' Frank Oppenheimer



- If you can't explain it, you don't understand it well enough.
- When expecting to teach your brain organises the information in a more logical, coherent structure.
- Talk yourself into understanding.

e.g. How does a toaster work?

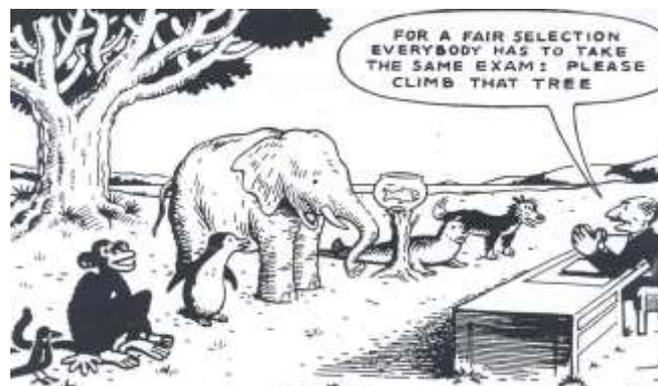
'Bread, push down, pops up' = factual recall only
Describe specifically out loud – 'Bread in slot, push it down, it has high resistance coils that go through and heats up as electrons try to push through and that heats up the toast. There is a bimetallic strip in there with 2 types of metal that bend as it gets hotter and eventually it trips it and that is when the toast pops up.'
If say that – **conceptual understanding**. Not there unless you can do that.

- Find a way to do this – talk to someone

6. Self-evaluate



- You can't evaluate yourself for the first time when you do the examination.
- If this is the first time you are evaluating/testing your understanding, it is too late!
- At every step of the learning process, you have take quizzes, practice tests, write questions to answers you have set yourself and write essays
- Testing helps identify gaps in knowledge, increases confidence.
- Ensure that you match the test to the sort of questions you will be asked in the exam



- You must, must test yourself at regular intervals, otherwise you will not know for sure whether you know it or not.
- If you do not do this throughout the whole learning circle, you won't be able to get it at the end
- Reflect on your learning regularly

7. Have a designated, sacred spot for studying



"Think this is bad? You should see the inside of my head."

Only you know what it takes to make a perfect study zone – for some a neat desk in a quiet corner, for others a relaxed messy space

It must be;

- well-equipped with everything you might need (a set of files/box files – one for each exam you will take, all the stationary you will need – hole punch, paper, pens, calculators etc. – keep them in one place so that you don't waste time searching for them!
- comfortable
- somewhere that inspires you – have a photo of your holiday destination to remind you why you are working so hard
- distraction-free

At the end of each session/day, file your notes so that the work area is clear

8. Don't listen to music

- It is detrimental to concentration.
- Students not using music focus much better



The Impact of Listening to Music on Cognitive Performance

Begin Page Content !

By **Arielle S. Dolegui**

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- Many students listen to music to alleviate the emotional effects of stress and anxiety when engaged in complex cognitive processing, such as studying for a test, completing homework assignments, or while reading and writing.
- This practice is so common that it would be beneficial for students to understand the role that music plays on cognitive performance.
- Research demonstrating the effects of music on performance is well documented, but have shown ambiguous evidence on this matter.
- In studies conducted to learn about the effects of musical distraction on cognitive task performance, the findings have demonstrated the idea of music improving cognitive performance (Cockerton, Moore, & Norman, 1997), but there has also been research contradicting those results, where music was found distracting for participants performing cognitive tasks (Furnham & Bradley, 1997).
- However, with the plethora of music genres available to music listeners, it is important to understand how different types of music impact performance.
- Additionally, very few studies address the interaction between the intensity or volume of the music played and its effect on cognitive processing.
- The present study aims to understand the effect of listening to different genres of music played at different volume levels on cognitive task performance.
- Many students choose to listen to a preferred genre of music when they study or do their homework without understanding the potential harmful effects of such practice.
- A study conducted by Smith and Morris (1977) addressed this question by studying the effects of sedative and stimulative music.
- The study focused on the influence these two distinct genres of music have on performance, anxiety, and concentration.
- Participants had to indicate their preferred genre and were requested to repeat a set of numbers backwards while listening to either the stimulative, sedative, or no music.
- **The results indicated that participants performed worse while listening to their preferred type of music.**
- **Additionally, in the no music condition, participants performed best.**
- These results indicate that a preferred type of music can serve as a distracting factor when one is engaged in a cognitively demanding task perhaps due to the fact that less cognitive resources are available when the attention is drawn to the lyrics, emotions, and memories that such music can evoke.
- **Participants who listened to sedative music performed better than participants who listened to stimulative music and worse than those who listened to no music at all.**
- These results indicated that stimulative music is a stronger distractor and obstructs cognitive processing more than sedative music does.
- The influence of music on cognitive performance has also been linked to personality types. A study conducted by Furnham and Bradley (1997) illustrated pop music as a distractor on the cognitive performance of introverts and extraverts.
- They predicted that extraverts would outperform introverts in the presence of music.
- The participants were required to perform two cognitive tasks: a memory test with both an immediate and a delayed recall and a reading comprehension test.
- The two tasks would be completed in the pop music condition as well as in silence.
- **The results determined that immediate recall on the memory test was severely impaired for both introverts and extraverts when the pop music was played.**
- In the delayed recall component of the memory test, introverts showed significantly poorer recall than did extraverts in the pop music condition as well as introverts in the silent condition.

- Also the introverts' performance on the reading comprehension task in the pop music condition was impaired when compared to extraverts in the same condition and to introverts who performed the task in silence.
- **Overall, the researchers determined that pop music served as a distractor for the cognitive performance of both extraverts and introverts;** however, introverts seemed to be most affected.
- Interestingly, this study revealed some evidence that overall background noise, such as television, music, and chatter could improve performance in complex cognitive tasks for extraverts, although it will significantly impair introverts' performance (Furnham & Bradley, 1997).
- Studies involving noise as a distraction have demonstrated the same ambiguous results regarding their effect on cognitive processing as studies involving background music.
- Dobbs, Furnham, and McClelland (2011) conducted a study that tested the effect of distracters, specifically background noise and music, on cognitive tasks for introverts and extraverts.
- The researchers hypothesized that performance, for both introverts and extraverts, would be worse in the presence of music and noise than it would be in silence; specifically, for all the cognitive tasks, performance would diminish in the presence of background noise, improve with only background music, and be optimal in silence.
- The findings supported their predictions and **showed that cognitive performance in silence was better than performance with background music, which in turn was better than performance with background noise.**
- The results also demonstrated that, overall, **performance in silence was best when compared to performance in background noise and music** (Dobbs, Furnham, & McClelland, 2011).
- **In contrast, a study conducted by Pool (2002), monitored the distracting effects of background television on homework performance and did not find any significant impairment on homework assignments when students were distracted by television while working on those assignments.**
- These findings indicate that background noise, just like background music impacts cognitive performance in ways that have not been fully understood by researchers.
- Although previous research has established that music can either distract or facilitate cognitive task performance, improved performance in the presence of music might be directly related to the type of music listened to (Cockerton, Moore, & Norman, 1997).
- A study conducted by Hallman, Price, and Katsarou, (2002) supported this argument. In fact, **they tested the effect of calming and relaxing music on arithmetic and memory performance tests in children ranging from ages ten to twelve.**
- **They found better performance on both tasks in the calming and relaxing music condition when compared with a no-music condition.**
- **They also tested these children in an arousing, aggressive, and unpleasant music condition, and the results showed that their performance on both tasks was heavily disrupted and led to a lower level of reported altruistic behavior by the children (Hallman, Price, & Katsarou, 2002).**
- Although this data did not find that calming music enhanced performance, one might imply that this type of music can provide a soothing environment that puts students at ease, facilitating cognitive processing.
- The present study considers the effects of two different types of music at varying intensities on cognitive task performance and compared them to tasks performed in silence.
- It was predicted that tasks performed in silence would yield better results than tasks performed both in the soft music and the loud music conditions, demonstrating that music is a distractor to cognitive performance.
- Additionally, performance scores were expected to be significantly lower in the presence of loud music at a high intensity, suggesting that both the type of music and the volume at which the music is played are contributors to the distracting effect of music.
- Finally, performance was predicted to be significantly higher in the presence of soft music compared to loud music.

9. Put away your phone/ipad etc!

- A no-brainer! Your texts and social media notifications severely decrease concentration
- Facebook is for breaks!
- Selfcontrolapp.com



10. Have fun!



- Make a study group, study with other people, enjoy learning
- Meet together to 2/3 times a week to revise topics as a group
- (Make sure they don't turn into chat sessions!)
- Within a group, other people's likes will be different from yours. This means you can help make each other aware of the syllabus as a whole
- On account of the different interests, members of the group will find themselves likely to 'teach' others whenever their special topics come under discussion
- *Try and enjoy it!*