DOCUMENT 1

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Research – Modified Vehicle Purchases

Brief	There has been a theme developing in requests before the AAT for the Agency to purchase a vehicle and then to also fund modifications to the vehicle. In an effort to assist participants/applicants in identifying appropriate pathways to purchase their own vehicle, we would like to compile a list of resources including the following: • Low Income Loan resources • Pre-owned modified vehicles for sale (is there a database/website etc. where these are listed? What are the safety requirements when selling/purchasing a pre-owned modified vehicle?) • Community Organisations who assist in fundraising What wheelchair accessible ride share services are available and where? (e.g. Uber WAV was being trialled in Australia in 2018, GoGet was a service available at Royal North Shore Hospital)
Date	14/05/2021
Requester(s)	Naomi [s47F- personal privacy] - Senior Technical Advisor (TAB/AAT) Shannon [s47F- personal privacy] – Assistant Director (TAB/AAT)
Researcher	Jane [s47F- personal privacy] - Research Team Leader (TAB)
Cleared	N/A

Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision-making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.

1 Contents

2 Low Income Loan Resources

There are various websites that compare fixed and variable interest rates for personal loans as well as payday loan lenders. However, it isn't appropriate to provide links as these companies are often paid advertising fees by lenders and payday lenders can often end up being more expensive due to excessive administrative and establishment fees. Only government approved and not-for-profit organisations are presented below.

2.1 MoneySmart

Moneysmart is run by the Australian Securities and Investments Commission (ASIC), the corporate, markets, financial services and consumer credit regulator in Australia.

Its aim is to help Australians of all ages, backgrounds and incomes to increase their financial wellbeing and build a better life. Through the Moneysmart website they:

- encourage saving
- provide simple steps for the 1 in 3 people who feel stressed and overwhelmed by money
- encourage informed use of financial products and services
- increase retirement preparedness
- provide specialist support for priority audiences

They provide assistance with the below area:

- Managing your money
    - Financial counselling
    - Urgent help with money
    - Save for an emergency fund
    - Managing on a low income
    - Problems paying your bills
- Reduce you debt
    - Get debt under control
    - Pay off your mortgage faster
    - Debt consolidation
    - Switching home loans
- Plan for your future
    - Saving
    - Grow your super
    - Develop an investing plan
    - Financial advice
    - Life insurance
- Grow your wealth
    - Buying a house
    - Investor toolkit
    - Choose your investments
    - Shares
    - Managed funds and EFTs
- Tools and resources
    - Budget planner
    - Choosing a financial advisor
    - MySuper funds list
    - Superannuation calculator
    - Unclaimed money

2.2 Good Shepherd

Good Shepherd are a charitable organisation that support women, girls and families experiencing hardship. They provide various financial services including:

- No Interest Loans (NIL) – up to $3,000
- Insurance – affordable and simple insurance policies
- Good Money Stores – financial services for people on low incomes

3   Locating Pre-Owned Modified Vehicles

Many of the suppliers of new modified wheelchair accessible vehicles sell used or demonstrator vehicles. These listed on each individual website and are often in high demand (some note they sell out before being listed on their website).

The E-Bility and Car Sales website appear to have the most used vehicles listed. They are the easiest to navigate and show vehicles from across the country.

Unable to find any safety requirements for sellers or purchases of pre-owned modified vehicles. It is generally the purchasers' responsibility to research a particular vehicle and have it inspected by a qualified mechanic before purchasing.

3.1   Car Sales

The Car Sales website doesn't have a feature which allows for the identification of wheelchair modified vehicles. However, you can keyword search 'disability' or 'wheelchair' and cars which match this description will be shown.

3.2   E-Bility

E-Bility is an accessible marketplace for all disability equipment and products. E-Bility is owned by the not-for-profit organisation IDEAS.

The website advertises private, commercial ex fleet or refurbished disability access vehicles. Cars are listed by individuals sellers with descriptions provided.

3.3   Fabcar

Fabcar stock a wide range of new and used wheelchair accessible vehicles for sale in Perth, Western Australia.

3.4   Freedom Motors Australia

Prices not listed but can be requested.

List the vehicle details (year, model, fuel type, petrol, colour, and odometer), modification details, inclusions, condition.

3.5   Wheelchair Vehicle Sales

Queensland business Wheelchair Vehicle Sales supply quality used vehicles from Japan that are factory modified. They currently have government approval to import 52 different vehicles models (see compliance page for list). A Description and vehicle details are provided for each vehicle.

3.6   Integrity Care Sales and Rentals

Integrity Car Sales and Rentals have a diverse range of wheelchair accessible cars and vehicles for sale. The modified vehicles advertised for sale are converted or manufactured specifically for disability access in mind.

All cars have Engineers Certificate and comply with the Australian Design Rules.

1. All disability vehicles are checked, tested, serviced and come with log books and warranties
2. All Wheelchair Car Conversions are done by the vehicle manufacturer to the highest standards

Various wheelchair access vans and van customisations include:

• Private and commercial use
• New and used existing vehicles for wheelchair car access
• Sloping mechanism
• Swivel chair
• Front seat or back seat passenger options available
• Multiple disabled access options available, i.e. two wheelchair positions available

3.7   Auto Mobility

Supplier of Wheelchair Access Vehicles (new and demonstrator models). They offer nation-wide service and repair, quality assurance and after sales support. They can provide multiple options including driver's seat, front passenger, and second or third row conversions.

3.8   Mobility Vehicle Sales

Company based in Adelaide, South Australia. For interstate buyers, vehicles can be transported all over Australia to your door. They advise to contact them with requirements as vehicles often sell before being listed on their website.

Imported vehicles are handpicked from Japan. The company "have nearly 25 years vehicle importing experience".

3.9   Import Revolution

Service the Melbourne, Geelong, Bendigo, Ballarat, and Gippsland areas regions. Provide imported cars which adhere to the Australian Design Rules through a registered automotive workshop. Sell new and used wheelchair accessible vehicles.

3.10 Nation Wide Mobility Vehicles

Located on the Sunshine Coast. List a range of vehicles such as Toyota Noah, Nissan Cube, Toyota Hiace, Toyota Porte, Toyota Tarago and Kia Carnival.

3.11 MotorMan Imports

Registered motor vehicle dealer at sells second hand wheelchair vehicles.

3.12 East Coast Commercials

Sell wheelchair buses and vans. No information provided on types or safety requirements.

3.13 Insurance

Blue badge insurance offers insurance for cars that have been converted for drivers or passengers with a disability. Other insurance companies can often see disability modifications as risks which leads to higher premiums. Some of the benefits include:

- Discounted premiums, by up to 25%^, for Disability Parking Permit users.
- New for old replacement option for disability conversions.
- Cover your family, friends, carers or support workers who drive your car.
- Monthly repayment options available.
- Up to $5,000 cover for assistive technology (wheelchair, walkers, mobility scooter etc.) while in your car.

4   Community Fundraising Organisations

4.1   Variety Vehicle Modification Grant

Variety provides up to $10,000 towards the modification of a vehicle to make it possible for a child to access and travel in the family vehicle, something they are currently unable to do due to their disability.

Vehicle modifications include changes to a vehicle or the installation of equipment in a vehicle that will enable a child to gain access to the vehicle. This can include enabling the child to:

- Get in and out of the vehicle with or without a wheelchair.
- Carry their wheelchair in or on the vehicle without lifting.
- Be transported safely whilst seated in their wheelchair.

4.2   Sunshine Butterflies

Sunshine Butterflies offers a 'Personal Fundraising Initiative' to assist families, individuals, and disability groups or clubs to raise funds for various supports. Through Sunshine Butterflies:

- Members are able to raise the funds needed to achieve their goals by using the security of a registered charity with deductible gift endorsement.
- Sunshine Butterflies will help members create their own personal fundraising page online.
- Members are able to send their page link to friends, family and colleagues who can read their story, make a donation and leave a personalised message.
- Personal Fundraising allows prospective donors to give directly to an appeal of their choice.
- Creating a personal fundraising page is quick, easy and most importantly secure. Donations are collected online and automatically transferred to Sunshine Butterflies who will then allocate the amount to the individual, family or group once the desired goal is reached.

4.3   Vehicle Modification Subsidy Scheme

Administered by the State Wide Equipment Scheme. Maximum subsidy of $10,000, per person, over a seven year period.

A VMSS subsidy is not available as a contribution towards the cost of:
- the vehicle
- modifying multiple vehicles
- non-disability-specific items such as rear-vision cameras, rear-parking sensors, global positioning system devices, mirrors and cruise control
- vehicle transmission conversion
- vehicle running costs, statutory charges or insurance premiums
- modifications to vehicles owned by organisations
- items of second hand vehicle related modifications

Refer to the Vehicle Modification Subsidy Scheme guidelines for further information on eligibility and inclusions.

4.4   Australian Lions Foundation

The Australian Lions Foundation provides various grants that may possibly cover vehicle purchases or modifications.

General grants: must be for specific items and not for general or central funds. Projects for which support is sought must be community based welfare projects

Special Purpose Grants: To provide help and assistance in all forms for community welfare on a National, State or District basis. Such Grants may have conditions imposed, as regards use of the funds and ultimate accountability, as are deemed necessary. No matching funding shall be required for a Special Purpose Grant.

Compassionate Grants: Grant of funds to a person or families that are suffering financial hardship through illness or other necessitous circumstances judged worthy by the Trustees. In the first instance the applicant should contact the "Chairman of the Australian Lions Foundation" explaining details of the circumstances.

4.5 Rotary Australia

In January 2017, Rotary Australia announced its Compassionate Grants program to help Australians in need.

Grants are assessed by the Rotary Australia Benevolent Society (RABS) and funds distributed to **disadvantaged Australians** identified by local Rotary Clubs or Rotary Districts as being in need within their local or wider community.

Projects granted funding must meet RABS criteria for registration. They must provide direct relief to people in need. If the intended recipients are disadvantaged, the relief should target that disadvantage.

The concept of disadvantage is unlimited and could have arisen from sickness, suffering, distress, misfortune, disability, destitution, helplessness or poverty, any aspect of the negative side of the human condition. The criteria are not prescriptive but are to be used as a guide to determine the disadvantage.

Example of projects funded where person or group was potentially disadvantaged under the above criteria:

- **Provision of a modified family motor vehicle for a 6 year old with cerebral palsy**
- Modifications to a home to assist access and functionality for a quadriplegic
- Financial assistance for a seriously injured sportsman's family
- Ongoing support for non PBS medicines for a sufferer of Lymes disease
- Provision of a specialised bed for a person with Parkinson's Disease
- Supply insulin pumps to three children with juvenile diabetes
- Provision of improved prosthetics for an amputee
- Assistance to a family who lost everything in a fire
- Provision of financial assistance to a young family whose mother drowned

5 Wheelchair Accessible Ride Share Services

5.1 Uber

No evidence that Uber Wheelchair Accessible (WAV) is available in Australia. There are various reports of trials in Brisbane and Newcastle approximately 5 years ago. A *submission to the Inquiry into the operation of the Point to Point Transport (Taxis and Hire Vehicles) Act 2016* [1] found that:

1) The trial supported only a limited number of riders.
2) Success of the trial was limited due to eligible Taxi Transport Subsidy Scheme (TTSS) members not being able to use subsidies on Ube, and therefore are unable to compete on price.

In March 2020, Commercial Passenger Vehicles Victoria (CPVV) announced a pilot with Uber, inviting existing scheme members in the Greater Geelong area to use their subsidies through Uber [1].

Subsidies can be applied to a range of products including Uber X, Uber Assist and Uber XL, providing people with a permanent disability a greater choice in their transportation options.

Uber Assist uses certified drivers who can give special assistance to riders who may need extra help. Drivers can help load and unload assistive devices that can fit in the trunk of a standard sedan once folded or disassembled. The 'transport for all' report conducted by the Disability Resources Centre found that no participants in their survey used Uber assist as vehicles were never available when they needed them [2]. Others reported not wanting to use the service as they *"…did not feel that the drivers were adequately trained or regulated."*

5.2   GoGet

Car share company GoGet has a Kia Carnival that is wheelchair accessible.

The car is available at a site located at the Royal North Shore Community Health Centre. 2 Herbert Street, St Leonards, NSW, 2065.

6   References

1.   Uber. Submission to Inquiry into the operation of the Point to Point Transport (Taxis and Hire Vehicles) Act 2016. 2020. Available from: https://www.parliament.nsw.gov.au/lcdocs/submissions/68063/0083%20Uber.pdf.

2.   Disability Resources Centre. Transport for all. 2019. Available from: https://drc.org.au/wp-content/uploads/2018/11/drc0001-transport-report-online.pdf.

CPAP funding, management and use

The content of this document is OFFICIAL.

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>
> The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters.

Research question:

Are there publicly funded or subsidised CPAP services available in Australia?

What is the prevalence of CPAP use?

Where are the machines sourced and what is an average cost?

Are CPAP machines effective as a treatment for anxiety or depression?

Date: 14/02/2022

Requestor: Shannon s47F- personal privacy

Request endorsed by (EL1): n/a

Cleared by: Stephanie s47F- personal privacy

1.   Contents

2.   Summary

CPAP is a commonly used device that is the first line treatment for moderate to severe obstructive sleep apnoea (OSA). There is no data for use of CPAP machines across Australia though moderate to severe OSA is quite common with adult prevalence ranging from 7% to 16%.

Online retailers based in Australia often offer trial and rental of CPAP devices. The most common brands of CPAP are generally above $1000 though new machines can be found for as little as $695.

There is strong evidence that CPAP use can treat symptoms of depression in people who meet criteria for clinical depression. Evidence suggests CPAP use does not have the same effect on symptoms of anxiety.

3.   CPAP use in Australia

A CPAP machine is:

> A type of positive airway pressure ventilator that applies continuous mild air pressure. It keeps the airways continuously open in people who are able to breathe spontaneously on their own, but need help keeping their airway unobstructed (AIHW, 2021, p.27).

CPAP therapy is used to treat OSA and is the usual first line treatment for moderate to severe OSA (Askland et al, 2020, p.12; Pinto & Sharma, 2021). It can also be used to treat respiratory distress syndrome in pre-term babies (Pinto & Sharma, 2021).

I am unable to accurately determine prevalence of CPAP use in Australia. According to a 2021 Australian Institute of Health and Welfare (AIHW) report, there is no prevalence data for use of CPAP in Australia (AIHW, 2021, p.23).

A 2017 systematic review estimated OSA prevalence across the general population. Prevalence of moderate to severe OSA in the adult population ranged from 6% to 17% with frequency increasing with age (Senaratna et al, 2017). This may give some indication of the percentage of adults who could benefit from CPAP therapy.

Another tool for approximating CPAP use across Australia is found in tracking Medicare Benefits Schedule item 12204. This is used when a clinician needs "to assess positive airway pressure. This study is performed overnight in a sleep study centre following diagnosis of a sleep disorder and the recommendation of CPAP therapy" (AIHW, p.27). According to the AIHW report, 16,631 patients received item 12204 in 2019.

3.1   Cost and retailers of CPAP machines in Australia

Refer to 7. Cost of CPAP machines in Australia for a table of comparative costs. There are several Australia-based online CPAP retailers. The two most common brands of fixed pressure CPAP machine are ResMed and Fischer & Paykel. New machines in both common brands are generally over $1000. DeVibliss, BMC and SmartMed produce machines that generally retail for under $1000. Parts and consumables such as tubes, masks, filters etc may come with purchase of the machine and then require replacement.

CPAP Australia offers trial or rental of the ResMed Airsense 10 Elite for $35 / week (CPAP Australia, CPAP trials and rentals). CPAP Victoria offers trials for $30/week for a minimum of 4 weeks (CPAP Victoria, Trials). CPAP Direct deducts the cost of the first month of machine hire from the purchase price (CPAP Direct, CPAP Machine Hire).

4.   Public funding of CPAP machines

4.1   National

If a patient has a Commonwealth concession card, they may also be eligible for the Essential Medical Equipment Program through Services Australia. This program provides $164 per year to assist with the electricity costs of essential medical equipment including CPAP machines (Services Australia, 2021).

4.2   Victoria

On 8th February I spoke to Jenny from State-Wide Equipment Service (SWEP). She said that SWEP does not fund CPAP machines at all. She transferred me to Empower Care Options, who assist NDIS participants and non-funded Victorians with equipment purchase and repair.

Lydia from Empower Care Options confirmed SWEP does not fund CPAP machines. She said that Empower Care Options has a stock of 10 new ResMed Air Sense 10 Elite CPAP machines which they are selling to consumers at a reduced cost. The overall cost is $900 plus $20 delivery charge. This brand of CPAP machine retails for between $998 and $1374 ([7. Cost of CPAP machines in Australia](#)). Lydia also confirmed that they do not fund or subsidise the cost of repairs or maintenance to CPAP machines they have sold (refer to [5.1 State-wide equipment service](#)).

The Australian Sleep Association (ASA) conducted a brief inquiry into public funding of CPAP machines in 2019. The funding of CPAP machines in Victoria was found to be "fragmented and highly variable". Individual public hospitals were able to offer CPAP machines to some patients depending on severity of sleep apnoea and financial difficulty. The criteria varied and were determined by individual hospitals (Australian Sleep Association, 2019).

Jennifer [s47F- personal privacy] a sleep scientist from Box Hill Sleep Clinic confirmed in a phone conversation on 8th February that all hospitals have their own criteria for providing CPAP machines to patients. In a follow up email Jennifer confirmed that to be eligible for a CPAP machine funded by the hospital, patients need:

- a diagnosis of severe OSA
- either aged or disability pension
- to demonstrate compliance with treatment (at least 4hours/night over 4 weeks)
- to have purchased their own mask (refer to correspondence in [5.2 Eastern Health](#)).

In a phone conversation on 9th February, Dr Christopher [s47F- personal privacy] Director of the Sleep Laboratory at Austin Health, described their process for funding CPAP machines for patients. A patient may be eligible for a subsidised CPAP machine if they have had their sleep study performed at the Austin and they can demonstrate a financial need. The latter is usually demonstrated by possession of a health care card but this is up to the discretion of the clinician. If a patient is eligible, they can pay $50 for a 4-week trial of a CPAP machine. If trial is successful, they can pay an additional $295 to have the machine permanently. This cost includes mask and tubes but does not include repairs or maintenance. The Austin will only subsidise one device for the patient.

I reached out to 3 other hospitals in Victoria but have not received any further responses.

The Victorian government offers a concession on power costs for people who have a concession card and use a life support machine which takes at least 1880 kilowatt hours per

year. They state, "[m]ost continuous positive airways pressure (CPAP) machines do not meet the 1,880-kilowatt hour threshold" (Department of Families, Fairness and Housing, 2021).

4.3   New South Wales

Enable NSW administers the Home Respiratory Program (HRP). To be eligible for support from Enable NSW, a person must:

- be residing in NSW or Lord Howe Island

- be enrolled with Medicare

- require the assistive technology to support a health need

- require the assistive technology to remain independent at home

- not be eligible for compensation or damages

- not be eligible to receive assistive technology through any other government-funded program.

In addition, to be eligible for HRP a person must have stopped smoking for at least 4 weeks. There are also other eligibility criteria specific to each respiratory device (EnableNSW, Home Respiratory Program). An adult must demonstrate **one** of the following criteria:

- Oxygen desaturation index (ODI) ≥ 30/hr

- Apnoea Hypopnea Index (AHI) ≥ 30/hr

- Apnoea Hypopnea Index (AHI) ≥ 20/hr and a relevant comorbidity

- Hypoventilation/ daytime hypercapnia with one of the following:

    – transcutaneous carbon dioxide (TcCO2) rising ≥ 8 mmHg from baseline

    – awake partial pressure of carbon dioxide (PaC02) ≥ 46 mmHg

    – a rise in PaC02 of ≥ 8 mmHg (Enable NSW, 2021a).

A person under 18 years old must demonstrate **one** of the following criteria:

- Obstructive Apnoea Hypopnea Index (OAHI) ≥ 15/hr

- OAHI ≥ 10/hr or OAHI ≥ 5/hr post adenoidectomy/tonsillectomy, and either:

    – minimum oxygen desaturation ≤ 85%

    – CO2 retention ≥ 8 mmHg

    – TcCO2 > 50mm Hg for 25% of the sleep study

    – documented evidence of significant cardiorespiratory co-morbidities (Enable NSW, 2021b).

Equipment through HRP is heavily subsidised. For adults on a pension or with a low income, or for children under 16 years old, there is a co-payment of $100. For adults with higher

incomes, they will be responsible for 20% of the total cost of the equipment. The customer is responsible for the purchase of their own CPAP masks. Enable NSW is responsible for repairs (Enable NSW, Home Respiratory Program).

4.4   South Australia

The South Australian Department of Human Services administers the Equipment Program which provides some equipment to adults with chronic health conditions and palliative care patients (Department of Human Services, Equipment Program). Kaye from the DHS Equipment Program confirmed in a phone call on 10th February that they do not fund or subsidise CPAP machines. According to the ASA's 2019 inquiry, South Australia does not have a state-wide system for funding CPAP machines. Further, as of 2019, the Southern and Central Adelaide Local Health Districts had limited budgets to provide CPAP machines for patients who have a concession card and meet certain OSA severity requirements (ASA, 2019).

4.5   Western Australia

The Community Aids and Equipment program (CAEP) may fund equipment for people living in WA who have a pension or concession card and who are not eligible for NDIS or other commonwealth programs. The equipment is offered as a long-term loan and should be returned when no longer required. CAEP judges requests on an individual basis but may fund equipment that is:

- essential for independent functioning and functional care at home
- the most basic model/type that meets the clinical need
- be for personal use only, that is not communal use
- required for use in the person's primary residence
- more than $50
- required for safety and behavioural purposes where applicable.

The WA Sleep Disorders Research Institute is a CAEP specialist provider administering funding for all respiratory equipment including CPAP machines (Department of Communities, Community Aids and Equipment Program). ASA states the clinical criteria for CPAP funding in WA are:

- AHI >15/hr
- demonstrated satisfactory use (average at least 4 hours per night), at their own expense; and
- benefit (either a reduction in Epworth Sleepiness Scale or clinician indicating clinical benefit was obtained) during a CPAP trial (ASA, 2019).

I have not been able to confirm that these criteria are still current.

4.6 Tasmania

The state equipment provider TasEquip does not manage CPAP machine funding (Department of Health, Medical Aids and Equipment). I was unable to establish availability of other funding through local hospital districts.

4.7 Northern Territory

CPAP machines are not on the Approved Equipment list for the Territory Equipment Program (NT Health, Territory Equipment Program). ASA refers to a Respiratory Appliances Loan Scheme but this program appears to no longer operate (ASA, 2019). I was unable to establish availability of other funding through local hospital districts.

4.8 Australian Capital Territory

People who hold a commonwealth concession and meet ACT residency requirements may be eligible for a permanent loan of a CPAP machine from the Domiciliary Oxygen and Respiratory Support Service (DORSS). Patients must meet the following clinical criteria:

- be assessed and referred by an approved consultant

- have completed studies at a recognised sleep study unit within the last twelve months and successfully trialled the recommended unit for a minimum of 1 month.

- have a diagnosis of severe or moderately severe OSA confirmed by polysomnography as indicated below:
  - severe OSA is diagnosed where Respiratory Disturbance Index (RDI) > 30
  - moderately severe OSA is diagnosed where RDI > 20 and minimum overnight Oxygen Saturation < 90%
  - patients with an RDI > 10 accompanied by symptoms of excessive daytime sleepiness and documented cardiovascular diseases including hypertension, ischaemic heart disease or stroke.

There are no co-payments, though patients are responsible for purchasing replacement consumables (masks etc.). The CPAP machine remains the property of the ACT government. Repairs are conducted through ACT Government contract (Department of Health, ACT DORSS).

5. Effect of CPAP on anxiety and depression

Evidence of the effectiveness of CPAP use as a treatment for anxiety and depression in people with OSA is mixed though strongly suggests that it is effective on depressive symptoms.

A 2014 systematic review and meta-analysis found use of CPAP improves depressive symptoms. However, there was significant heterogeneity between trials and comparative effect of CPAP versus other treatments of depression was unclear (Povitz et al, 2014). This contrasts with a recent American Academy of Sleep Medicine systematic review of treatments for obstructive sleep apnoea. The researchers performed a meta-analysis of 5 studies measuring effects of CPAP use on mood. The meta-analysis revealed no clinically significant improvement in mood as measured by the Hospital Anxiety and Depression Scale. The studies included in the meta-analysis did not recruit participants who already presented with depression or anxiety (Patil et al, 2019, p.311). This is noteworthy as other studies have found that the effect of CPAP on depressive symptoms was larger in populations that met the criteria for depression (Povitz et al, 2014, p.3-4; Zheng et al, 2019, p.94).

A 2019 examination of 2687 subjects found a significant reduction in depressive symptoms but no clinically significant effect on anxiety symptoms (Zheng et al, 2019, pp.91-92). An associated systematic review and meta-analysis confirmed the effect on depression but not anxiety symptoms (p.94). Whether the subject was CPAP-adherent (defined as using the machine on average 4 or more hours each night) did not change the treatment effect (p.91). This is supported by a 2020 Cochrane review found that while certain interventions are shown to improve usage of CPAP machines, the current evidence does not demonstrate that increased usage improves functional or quality of life outcomes (Ackland et al, 2020).

6.   Correspondence

6.1   State-wide equipment service

From: Empower Care Options <empowercareoptions@bhs.org.au>

Sent: Tuesday, 8 February 2022 3:31 PM

To: [s47F- personal privacy] Aaron <Aaron.[s47F- personal privacy]@ndis.gov.au>

Subject: RE: [External Email] CPAP machine inquiry [SEC=OFFICIAL]

I can confirm this is all correct.

Thank you

Kind Regards,

Lydia [s47F- personal privacy] |Administration Officer

Empower Care Options|Ballarat Health Services/Part of Grampians Health

P.O. Box 1993, Bakery Hill Vic 3354

P 1300 747 937 | E lydia.[s47F- personal privacy]@bhs.org.au | E empowercareoptions@bhs.org.au

OFFICIAL   For Internal Use Only

Monday – Friday 8:30am – 5:00pm

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From: [s47F- personal privacy] Aaron <Aaron.[s47F- personal privacy]@ndis.gov.au>

Sent: Tuesday, 8 February 2022 2:09 PM

To: Empower Care Options <empowercareoptions@bhs.org.au>

Subject: [External Email] CPAP machine inquiry [SEC=OFFICIAL]

Hi Lydia

Thanks so much for your time this afternoon.

As per our discussion, can you please confirm:

- Victorian Aids and Equipment program / State-wide equipment program no longer funds or subsidises the purchase of CPAP machines

- Empower Care has a stock of 10 reduced cost RESMED AIRsense 10 Elite CPAP machines available for purchase at $900 plus $20 delivery

- you are not aware of any other equipment program in Victoria that funds or subsidises the purchase of CPAP machines

- neither Empower Care, VA&EP or SWEP will fund or subsidise repairs to CPAP machines.

Thanks again and all the best

Aaron [s47F- personal privacy]

Research Officer

National Disability Insurance Agency

Email aaron.[s47F- personal privacy]@ndis.gov.au

6.2   Eastern Health

From: [s47F- personal privacy] Jennifer <Jennifer.[s47F- personal privacy]@easternhealth.org.au>

Sent: Wednesday, 9 February 2022 10:45 AM

To: [s47F- personal privacy] Aaron <aaron.[s47F- personal privacy]@ndis.gov.au>

Subject: Hospital Funded CPAP - Eastern Health

Hi Aaron,

Further information after our conversation yesterday.

All patients need to be referred from a sleep physician in the public outpatients and have a least one overnight sleep study at Box Hill Hospital.

Patient need:

Diagnosis of severe OSA

Either Aged or Disability Pension

Demonstrate compliance – at least 4hours/night over 4 weeks

Purchased their own mask

Hope that helps,

Kind regards,

Jennifer s47F- personal priva

Sleep Scientist

Box Hill Hospital

P: s47F- personal privacy | E: jennifer.s47F- personal priv@easternhealth.org.au

Part time: Monday - Thursday

5 Arnold St, Box Hill

7.   Cost of CPAP machines in Australia

Machine	CPAP Australia (link)	CPAP Direct (link)	CPAP Victoria (link)	NSW CPAP (link)	The CPAP clinic (link)	CPAP club (link)	Sleepzone (link)
ResMed AirSense 10 Elite Fixed Pressure CPAP Machine	$1315.00	$1195.00	$1374.00	$1023.00	$998.00	$1250.00	
Fisher and Paykel SLEEPSTYLE CPAP Machine	$1395.00	$1195.00	$1395.00	$1330.00	$850		
DeVilbiss Sleepcube Standard Plus CPAP Machine with Humidifier					$695.00		
BMC G3 C20 Fixed Pressure CPAP Machine						$895.00	$900.00
SmartMed SmartMed iBreeze Fixed Machine		$995.00					

8. References

Askland, K., Wright, L., Wozniak, D. R., Emmanuel, T., Caston, J., & Smith, I. (2020). Educational, supportive and behavioural interventions to improve usage of continuous positive airway pressure machines in adults with obstructive sleep apnoea. *Cochrane Database of Systematic Reviews*, *4*, CD007736. doi10.1002/14651858.CD007736.pub3

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9. Version control

Version	Amended by	Brief Description of Change	Status	Date
1.0	AHR908	Research paper representing the first instalment of a body of research on CPAP machines. This paper focuses on: • publicly funded or subsidised CPAP services in Victoria • CPAP machines used as a treatment for anxiety or depression.	Cleared	09/02/2022
2.0	AHR908	Research paper expanded to include: • public funding available for CPAPs in Australia • prevalence of CPAP use • cost and retailers.	Cleared	14/02/2022

Intensive therapy for children with Cerebral Palsy, quality of literature

The content of this document is OFFICIAL.

Please note:

The research and literature reviews collated by our TAB Research Team are not to be shared external to the Branch. These are for internal TAB use only and are intended to assist our advisors with their reasonable and necessary decision-making.

Delegates have access to a wide variety of comprehensive guidance material. If Delegates require further information on access or planning matters they are to call the TAPS line for advice.

The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters

Research question: To provide a critical analysis regarding study quality for 7 papers of interest about intensive therapy for children with cerebral palsy.

Date: 24/02/2022

Requestor: Shannon [s47F- personal privacy]

Endorsed by (EL1 or above): n/a

Researcher: Aaron [s47F- personal privacy] and Stephanie [s47F- personal privacy]

Cleared by: Stephanie [s47F- personal privacy]

1. Contents

2. Summary

Analysis of quality of these research papers demonstrated quality of evidence rating ranging from low to high. In particular, the 2020 systematic review from Novak et al includes some high quality evidence regarding efficacy of certain interventions. Reasons for these rating assessments have been included in the table. Two papers were research protocols only, therefore the quality of the final research cannot be determined.

3. Literature Review

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality
1	Novak et al.	State of the Evidence Traffic Lights 2019: Systematic Review of Interventions for Preventing and Treating Children with Cerebral Palsy	Current Neurology and Neuroscience Reports. 2020. 20:3	To systematically describe the best available evidence for cerebral palsy interventions in 2019.	Systematic review of systematic reviews. Review conducted using Cochrane guidelines and reported according to PRISMA statement.	• NHMRC Level of Evidence of findings varies for treatment option. Where possible the reviewers assessed systematic reviews or randomly controlled trials (level I). Where high levels of evidence were not available, observational studies were included (level IV). This is reported clearly in Fig 2 (pp2-3) using the Evidence Alert Traffic Light System. • Quality of evidence of included studies is reported as Strong positive, weak positive, weak negative, strong negative. These levels correspond to confidence in the evidence and whether evidence favours treatment or not. Strong positives are mostly based on high quality randomly controlled trials. Weak positives ("probably do it") made up 66% of the data, however there was no statistical information from these original studies to determine the effect size that the GRADE ranking was based on.
2	Tinderholt Myrhaug et al	Intensive training of motor function and functional skills among young children with cerebral palsy: a systematic review and meta-analysis	BMC Pediatrics. 2014. 14: 292	To describe and categorise intensive motor function and functional skills training among young children with CP, to summarise the effects of these interventions, and to	Systematic review of controlled trials. Search directed at material from 1948 to 2012 with a supplementary search of material between 2012 and	• NHMRC Level of Evidence I – the study is based on several randomly controlled trials. • Search strategy was reported (Additional file 1). • This review contains studies from as early as 1975. The most recent studies were from 2012. Authors

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality
				examine characteristics that may contribute to explain the variations in these effects.	2014. Evidence was analysed from 29 randomly controlled trials and 9 controlled before and after trials.	identified relevant studies published between 2012 and 2014 that were not included in the analysis (additional file 2) but no follow up review has been published. More current evidence is available. • Reasonable sample of 1407 children with a mean age of 7 (one of the selection criteria). Part of the sample must be over the age of 7 and therefore results may not generalise for effectiveness of intensity of supports in early intervention. • 31 assessment tools were used across 29 published studies which makes comparison of results difficult. • Risk of bias: over half of the trials reviewed (19) had a high risk of bias. Only 9 trials had a low risk of bias. The reminder could not be determined. The authors did not justify inclusion of studies with a high risk of bias and acknowledge that bias is likely to affect the results of the meta-analysis.
3	Arpino et al.	Efficacy of intensive versus non intensive physiotherapy in children with cerebral palsy: a meta-analysis	International Journal of Rehabilitation Research. 2010. 33:10	To compare the efficacy of intensive versus non-intensive rehabilitative treatment in children with cerebral palsy.	Meta-analysis of 4 randomly controlled trials published between 1996 and 2007.	• NHMRC Level of Evidence I – the study is based on 4 randomly controlled trials. • The selection criteria and search strategy were not adequately reported. • The authors included no explanation of timeframe (1996 – 2007) indicating that this timeframe was determined after the studies were selected.

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality
						• The most recent study reviewed is from 2007. More current evidence is available. • 3 of 4 studies reviewed were based in the UK. • The total sample was 226 children, with 17 lost to follow-up. • Due to the limited number of studies reviewed, the authors suggest the results should not be taken as strong evidence for the lack of effectiveness of intensive therapy.
4	Araneda et al	Protocol of changes induced by early Hand-Arm Bimanual Intensive Therapy Including Lower Extremities (e-HABIT-ILE) in pre-school children with bilateral cerebral palsy: a multisite randomized controlled trial	BMC Neurology. 2020. 20:243	To assess the effects of HABIT-ILE adapted for pre-school children with bilateral CP regarding functional, neuroplastic and biomechanical factors.	Randomly controlled trial of HABIT-ILE. Sample of 50 children with CP aged 12 to 60 months. Treatment conducted over 2 weeks and compared to regular activity/rehab. Children assessed at baseline, 2 weeks after baseline and 3 months after baseline.	This is a protocol of how the randomized controlled trial will be conducted. It outlines the intention of the research methods and analysis, however the quality of the study cannot be determined from this protocol.
5	Park, E.	Effect of physical therapy frequency on gross motor function in children with cerebral palsy.	J. Phys. Ther. Scie. 28: 1888-1891. 2016.	To investigate the effect of physical therapy frequency based on neurodevelopmental therapy on gross motor function in children with cerebral palsy.	Observational, case series (no control group)	• NHMRC Level of evidence – level IV • Quality of evidence rating - low • Published in 2016 therefore more current evidence is available • There were significant correlations between physical therapy frequency and crawling/kneeling, standing and

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality
						GMFM total however these correlations were small (reflecting a weak relationship). • The author attributed the small correlations and non-significant correlations (with other gross motor function changes) to limitations with the outcome instrument without considering there just may not be the strong correlation between parameters that they had expected raises a risk of bias in their interpretation. • Author indicates due to a lack of sufficient evidence that further studies should be conducted
6	Sorsdahl et al	Long-term change of gross motor function in children with cerebral palsy; an observational study of repeated periods of intensive physiotherapy in a group setting	European Journal of Physiotherapy, 2020, 22(3), 148-154.	To investigate the effect of repeated periods of intensive physiotherapy in groups	Prospective, observational case series (no control group)	• NHMRC Level of evidence – level IV • Quality of evidence rating - moderate • Unclear recruitment method (i.e. were participants recruited consecutively or were they hand-picked for inclusion) • Results potentially compromised due to other interventions (41% botox injections, 18% had at least one of surgery, Baclofen pump or Selective Dorsal Rhizotomy) during the follow up periods • Significant drop off through the study period (start N=120, data for longitudinal analysis N=50) raises risk of bias of effect size. Reasons for drop out were not explored with the families; perhaps those who dropped out did not experience benefit from the intensive therapy.

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality

						• Participants and assessors were not masked to the intervention increasing the risk of bias.
						• Multiple assessors may impact reliability of data, however they attempted to control inter-rater reliability through training of assessors
						• Improvements may have been influenced by factors other than the intensive therapy
						  o Gross motor function increased more than expected over time (as expected from development curves) however it was noted that the age of the children included in the study "was during an age period where the motor development curves are on their steepest slope. Mass practice of skill acquisitions and motor activities against gravity in everyday life is quite common at this age, also in children with CP. Such everyday-life activities could have added to the results gained during the intensive training sessions"
						  o Also unclear how much the children practiced in their everyday life. No diary was kept that may highlight some benefits from activities other than the therapy
						• Longitudinal data was collected for children who participated in 4 blocks of 6 weeks of intensive therapy. This data was collected from children over 11yrs

	Author	Title	Source	Aim / Objective	Methods	Analysis of Quality
						therefore treatment may have changed, therapist skills may have changed • Demonstrated a statistically significant improvement of gross motor function for the group, but did not investigate whether the improvement was clinically significant for the individual child
7	Rahlin et al	How does the intensity of physical therapy affect the Gross Motor Function Measure (GMFM-66) total score in children with cerebral palsy? A systematic review protocol.	BMJ Open 2020;10:e036630.			This is a protocol of how the systematic review will be conducted. It outlines the intention of the research methods and analysis, however the quality of the study cannot be determined from this protocol.

4. Appendix

Table 2 NHMRC Evidence of hierarchy

Level	Intervention [1]	Diagnostic accuracy [2]	Prognosis	Aetiology [3]	Screening Intervention
I [4]	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies
II	A randomised controlled trial	A study of test accuracy with: an independent, blinded comparison with a valid reference standard,[5] among consecutive persons with a defined clinical presentation[6]	A prospective cohort study[7]	A prospective cohort study	A randomised controlled trial
III-1	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)	A study of test accuracy with: an independent, blinded comparison with a valid reference standard,[5] among non-consecutive persons with a defined clinical presentation[6]	All or none[8]	All or none[8]	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)
III-2	A comparative study with concurrent controls: • Non-randomised, experimental trial[9] • Cohort study • Case-control study • Interrupted time series with a control group	A comparison with reference standard that does not meet the criteria required for Level II and III-1 evidence	Analysis of prognostic factors amongst persons in a single arm of a randomised controlled trial	A retrospective cohort study	A comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case-control study
III-3	A comparative study without concurrent controls: • Historical control study • Two or more single arm study[10] • Interrupted time series without a parallel control group	Diagnostic case-control study[6]	A retrospective cohort study	A case-control study	A comparative study without concurrent controls: • Historical control study • Two or more single arm study
IV	Case series with either post-test or pre-test/post-test outcomes	Study of diagnostic yield (no reference standard)[11]	Case series, or cohort study of persons at different stages of disease	A cross-sectional study or case series	Case series

(National Health and Medical Research Council, 2009)

Table 3 GRADE Certainty Ratings

Certainty	What it means
Very low	The true effect is probably markedly different from the estimated effect
Low	The true effect might be markedly different from the estimated effect
Moderate	The authors believe that the true effect is probably close to the estimated effect
High	The authors have a lot of confidence that the true effect is similar to the estimated effect

(BMJ, 2022)

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6. Version control

Version	Amended by	Brief Description of Change	Status	Date
0.1	AHR908	Draft	Draft	23-02-2022
1.0	SJP131	Review	Cleared	24-02-2022

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Applied Behaviour Analysis for adults with ASD

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The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters

Research question: Is there any research evidence that ABA therapy is effective in the treatment of ASD in adults?

Date: 14/2/2022

Requestor: Adam s47F- personal pr

Endorsed by: Tom s47F- personal privacy

Researcher: Aaron s47F- personal privacy

Cleared by: Aaron s47F- personal privacy

1. Contents

2. Summary

There is evidence that interventions based on Applied Behaviour Analysis (ABA) can be effective in improving skills and outcomes and reducing concerning behaviour for older adolescents and young adults with autism. However, the evidence base is small and the literature mostly reports on single subject case studies or otherwise small sample studies.

There is a lack of consensus about effective and ethical intensity of behavioural interventions. ABA is a discipline which incorporates many different techniques and treatment protocols. It is possible that different ABA interventions would require different frequency and duration of supports. No studies were found that focussed on intensive ABA for older teenagers or adults.

The focus of this paper is on recent published research which summarises and reviews existing research. Considering the timeframe of this paper and the breadth of literature, it should be noted that there may be further relevant research we have not examined.

3.   Evidence for ABA in adults

Research on interventions for older adolescents and young adults with autism is scarce. Most of the research on ABA focusses on younger children. Results of research on younger children may not generalise for adults (Shattuck et al, 2020; Howlin, 2021; Lord et al, 2022; Rodriguez et al, 2022). Straiton et al (2021) conducted a survey study including 97 ABA providers that related to parent training as a component of ABA practice for people with autism under 21. They note that very few ABA providers were aware of evidence-based strategies for incorporating parent training in their program. Lord et al (2022) summarise the evidence:

> Behavioural programmes for adults with autism have been described for many years, although few are randomised controlled trials and many involve individuals with more severe intellectual disabilities. The use of behavioural approaches is also controversial among some neurodiversity advocates (Lord et al, 2022, p.290).

Much of the research on autism in adulthood focusses on life-stage outcomes rather than specific interventions (Mason et al, 2021; Howlin, 2021). Much of the research on use of behavioural interventions in adults with autism focusses on ethical issues and describes the controversy around long term use of ABA (Sandoval-Norton et al, 2019; Gorycki et al, 2020; Shkedy et al 2021).

Evidence-based behavioural interventions identified by Steinbrenner et al (2020) for 15-22 year olds include antecedent-based interventions, behavioural momentum intervention, differential reinforcement, discrete trial training, extinction, functional behavioural assessment, modelling, prompting, reinforcement, response interruption/reintegration, self-management, task analysis, video modelling, and visual supports. These interventions may make up an ABA program. It is worth noting that, for Steinbrenner et al, an intervention counts as evidence-based if it has support from either:

- two high quality group design studies conducted by at least two different researchers or research groups

- five high quality single case design studies conducted by three different investigators or research groups and having a total of at least 20 participants across studies
- one high quality group design study and at least three high quality single case design studies conducted by at least two different investigators or research groups.

This approach to evidence-based practice is challenged in the literature (Donovan et al, 2020; Lord et al, 2022). For instance, the Steinbrenner et al approach means that some practices may count as evidence-based even if they have only a small number of uncontrolled studies supporting them and even if very few subjects were involved in the intervention.

In their narrative review, Rodriguez et al (2022) provide more detail about some behavioural interventions they consider efficacious for adults. These include self-management, prompting, video modelling, visual supports, task analysis, behavioural skills training, and functional communication training. The authors note that for all these interventions there is minimal adult focussed research. Where evidence for efficacy in adult populations exists, it is usually based on single subject case studies or other small sample study designs. One recent systematic review found moderate to strong evidence that functional communication training can reduce challenging behaviours in adults with autism (Gregori et al, 2020). However, this was based on only 8 participants across 8 single case studies. Another recent study found behavioural skills training improved social and conversation skills for 6 adults with autism when delivered in a group setting (Ryan et al, 2019).

Theoretically, many of the principles of ABA should work for all age groups. For example, reinforcement may encourage target behaviour regardless of age group. However, effect size may be different and different skill areas may be targeted (e.g. community independence, vocational training) for older adults, young adults and adolescents. Also, there may be some issues of implementation. For example, Rodriguez et al (2020) note that removing reinforcement of undesirable behaviours can result in increases in aggression for up to 50% of subjects. For adults with aggressive behaviours this can pose a significant safety risk (Manente et al, 2010).

4.   Duration and intensity of behavioural intervention

There is a lack of consensus on the appropriate intensity and duration of behavioural interventions. Gerhardt et al (2022) suggest it is a myth that adolescents and young adults would no longer benefit from intensive ABA. However, while the authors cite evidence showing ABA may be effective for adolescents and young adults, they do not provide evidence for a high intensity of support. With respect to early intensive behavioural intervention, Leaf et al (2022) state that intervention is usually concluded prior to school age, though if a child still requires support then intervention should continue into school age:

> Although the average may be 3 years, research has shown that a successful duration can be anywhere between 6 and 36 months. Like the intensity of intervention, the

duration of intervention must be individualized to meet the needs of the individual learner (Leaf et al, 2022, p.254).

In contrast, the recent *Lancet Commission on the future of care and clinical research in autism* report states that the intensive ABA approach:

> as originally implemented, has little support from well-designed randomised controlled trials. However, it has been modified over the past few decades to be more naturalistic and developmentally appropriate, often with lower-intensity delivery and greater emphasis on the child as an active partner in communication. In addition, other studies have focused on teaching parents to support the child in the development of early communication and social interaction (Lord et al, 2022, pp.278-279).

Shkedy et al (2021) argue there is no research showing the effectiveness of ABA for people who have received treatment over 5, 10 or 15 years (also, Donovan et al, 2020). While the appropriate intensity and duration of support is in dispute, Lord et al maintain there is evidence that behavioural intervention can improve cognitive and emotional self-regulation and reduction in social difficulties for older children and young adults. They continue:

> As for other chronic and enduring health conditions, one-off, time-limited interventions will not be sufficient to enable long-term change for most people with autism. Instead, a developmentally sequenced series of staged and personalised interventions will be required for each individual, according to their developmental stage, profile of strengths and needs, and co-occurring conditions (Lord et al, 2022, pp.279-280).

The recommendation for a 'staged' service implies that the least intensive service is trialled to determine what the participant's needs are.

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Middle childhood and adolescent development

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The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters

Research question: What are the patterns of typical development through middle childhood and adolescence? What are the typical stages of functional ability?

Date: 11/8/2022

Requestor: Karyn [s47F- personal privacy]

Endorsed by (EL1 or above): N/A

Researcher: Stephanie [s47F- personal privacy]

Cleared by: Stephanie [s47F- personal privacy]

Date of next review: 11/8/24

1. Contents

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2. Summary

Children face different challenges at different age stages of their development; therefore, this research is divided into middle childhood (6-11 years) and adolescence to late teens (12-18 years). Research for early childhood (0-5 years) can be viewed in the TAB research paper Research - Expected abilities and challenges for children under 5.

Middle childhood is the period where formal education is started. In Australia, most children have started primary school by the time they turn 6 years old. Factors that influence a child's academic achievement include school readiness, the child's motivation and learning orientation, parental attitudes, and the classroom and school environment and policies. During middle childhood, children begin to develop independence by spending greater amounts of time away from home while they are at school, with peers or participating in extra-curricular sporting and social activities, however parents and family still play a key role in their overall development.

In Australia, most children have started secondary school the year they turn 12 years old. At this level, students typically spend 7 hours each weekday and just over 1 hour each day on the weekend to complete their educational activities. This includes going to classes, participating in extracurricular activities such as sport or music, and their homework. Some children find the transition from primary school to secondary school difficult and become disengaged from their learning, which can result in long term negative consequences for their academic performance and their health. Through adolescence, many teenagers will start a part-time job either around school hours or over the school holidays. Having a job can boost independence as they learn commitment to a new task, have the opportunity to learn new skills, get ideas for their future vocation, and earn some money for things they would like to purchase. Teenagers can apply for their driver's learner permit by time they turn 16 years old.

3. Middle childhood (6-11 years)

3.1   Social-emotional development and relationships

Children in middle childhood spend less time with their parents than during early childhood but continue to make many demands on parents (Louw & Louw, 2020). This includes parents transporting children to activities, supervising and assisting with homework, and supporting the child's behavioural learning in different contexts (e.g., school, community). During these years, children gradually become less dependent on their parents and want opportunities to make decisions affecting their life (Louw & Louw, 2020). As children demonstrate increased capacity to complete activities and make thoughtful decisions, effective parents gradually allow the child to have greater responsibility (Louw & Louw, 2020).

Self-regulation.

Self-regulation is the ability to manage behaviour and reactions to things happening around you, and includes (Raising Children Network, 2021a):

- Regulation of reactions to strong emotions like frustration, excitement, anger and embarrassment

- Calming down after being excited or upset

- Focussing attention on a task by ignoring surrounding distractions

- Impulse control to enable turn taking in games or sharing stories

The brain area responsible for self-regulation, the prefrontal cortex, is not fully developed until around 25 years of age. This means that while children in middle childhood have better regulation than when they were in early childhood, they can still struggle at times with impulsivity and an inability to regulate strong emotions (Bertoldo, 2020; Raising Children Network, 2021a). Children in middle childhood need the opportunity to learn how to self-regulate in different challenging situations, which can be provided through observing how parents or carers deal with frustration or their modelling of coping strategies during stress (Bertoldo, 2020), such as going for a walk or mindfulness (Raising Children Network, 2021a), and at their school through explicit social and emotional learning programs.

Raising Children Network (2021a) suggests the ability to self-regulate can be impacted by tiredness, illness and changes to routine. Additionally, some environments may be more difficult to self-regulate in than others (e.g., noisy crowded areas are often more difficult). It may be beneficial to seek professional help if a child has more tantrums or difficult behaviour than their peers, behaves in a dangerous manner for themselves or others, if positive behaviour strategies parents implement are not working, if they have difficulty interacting well with others, or if they do not have as many communication and social skills as other children their age (Raising Children Network, 2021a).

Emotional development.

During middle childhood, children show an increasing ability to understand complex emotions such as pride and shame and they can understand that more than one emotion may be experienced in a particular situation (Louw & Louw, 2020). There is greater ability to suppress or conceal their negative emotional reactions, which is associated with greater social competence and lower problem behaviour. Parents can support their child's emotional development by talking about emotions of characters in books or movies, help children recognise emotions and how their body feels at the time (e.g., nervousness = butterflies in tummy), teach their child to count to ten or breathe when feeling strong emotions (Raising Children Network, 2021b). Additionally, parents influence emotional development through children observing their reaction to difficult situations and through explicit instruction to their children; parents need to be aware and in control of their own feelings and non-verbal language when communicating with their child (Louw & Louw, 2020). Some children may need extra support with emotional development, for example if they make poor decisions due to frustration or feel strong emotions that are out of proportion to the problem (Raising Children Network, 2021b).

Influences on social development.

Children are exposed to many social learning experiences in middle childhood that can influence their development.

- Parents and carers can contribute to child social development in the following ways:

  - Direct instruction – explaining values and attitudes to their children; explicitly informing and advising on specific social situations; scaffolding/building social skills through different experiences according to the child's current level of functioning (Louw & Louw, 2020).

  - Indirect socialisation – through everyday actions with their child, parents model skills and communicate social information and rules. Parents' response to social situations, such as being understanding and helpful or aggressive and intolerant can model social behaviour to their children (Louw & Louw, 2020)

  - Social manager – parents manage children's social experiences and social lives, including exposure to different people, activities and information. Parents can choose certain types of environments, such as home, neighbourhood and school. Parents actively select their children's activities, set rules around children's friendships and whereabouts, and monitor children's behaviour from a distance. This can create a burden on some children who need to adapt to new routines and social scripts, and to changing parental expectations about their behaviour (Louw & Louw, 2020).

- Sibling relationships – siblings are an important source of support for children in middle childhood, however sibling rivalry also tends to increase as children get older (Louw &

Louw, 2020). Sometimes children feel that their sibling gets more attention or more material resources than themselves, triggering resentment. Occasionally sibling bullying can occur, which is linked to competitive and hostile sibling relationships.

- Peer relationships – in middle childhood children tend to interact more with other children of their age and gender, which tends to give an opportunity for social skills development including cooperation, negotiation, and compliance with peer-group rules that lead to acceptance (Louw & Louw, 2020). As children are becoming better at controlling their emotions, they play games that involve rules, winning and playing fair (Raising Children Network, 2022a).

- Friendships – middle childhood sees the emergence of loyal and faithful friendships built on personal qualities. Friendships at this age are becoming more complex, and it is normal for children to have fewer friends than in early childhood due to the selective nature of friendships at this stage (Louw & Louw, 2020). Friendships are fairly stable over middle childhood, and through this relationship children learn about emotional commitment – friendships can survive disagreements and tolerate criticism when friends are secure in their liking for each other (Louw & Louw, 2020).

Challenges.

- Bullying – being bullied can affect a child's confidence and self-esteem.

- School refusal – some children may become upset and agitated at the thought of going to school. This may manifest as emotional dysregulation, complaints of physical illness, and/or anxiety symptoms such as sleeplessness. Understanding the reason for school refusal can help parents and teachers work out a solution (Raising Children Network, 2021c).

- Difficult behaviour – challenging boundaries and rules is normal through pre-teens and adolescence as children test out independent ideas and ways of behaving (Raising Children Network, 2021d). This can involve disrespectful behaviour towards parents or risk-taking behaviours. If it extends to mood changes, school absenteeism or withdrawal from previously enjoyed activities then seeking professional support from school counsellors and/or their general practitioner may beneficial (Raising Children Network, 2021d).

- Understanding and managing difficult emotions – strong emotions can be overwhelming for children and they may need support from those around them to help calm them because: they are still developing self-regulation skills, they don't always have the words to express how they feel, they may have a temperament that makes them feel things more strongly, or they might find it hard to calm down in certain environmental (such as busy, noisy shopping centres) (Raising Children Network, 2021e). Parents and carers can support their children to calm down by staying calm themselves and supporting their child while they calm down. Some children with aggressive behaviour, such as children with autism spectrum disorder or attention deficit hyperactivity

disorder, may need extra support to manage their strong feelings and control impulses – this support can be guided by their therapist/care team (Raising Children Network, 2021e).

- Body image and eating problems can emerge in middle childhood as children become more aware of their body and changes due to puberty (Centers for Disease Control and Prevention, 2021a).

3.2   Mental health

Mental health is described as how children think and feel about themselves and the world around them and can impact how children manage challenges and stressors in their life (Raising Children Network, 2021f). Raising Children Network (2021f) suggests that good mental health in this age group looks like:

- Children feeling happy and positive about themselves *most* of the time

- Children are kind to themselves when times are difficult or when things do not go as planned

- Children appear to enjoy life, learn well and get along well with family and friends

- Children can manage their sad, worrying or angry feelings and bounce back from tough times

- Children are prepared to try new or challenging things.

Mental health is linked to resilience, the ability to 'bounce back' after a challenging event or adapt to changing circumstances (Raising Children Network, 2021g). To support a child's mental health, parents can: tell their child they love them unconditionally, use positive and consistent approaches for behavioural learning and consequences, be available to talk and listen each day, and take time to enjoy doing activities together regularly (Raising Children Network, 2021f).

Mental Health Disorders.

Data from the *Young Minds Matter* survey, a household survey conducted in 2013-14, estimated that almost 14% of Australian children aged 4-11 years experienced a mental health disorder in the preceding 12 months. Of these 72% were considered a mild mental health disorder, 20% moderate and around 8% were considered severe (Australian Institute of Health and Welfare (AIHW), 2022). The most common disorder was attention deficit hyperactivity disorder (ADHD), followed by anxiety, conduct disorder and major depressive disorder (AIHW, 2022).

Diagnosis of a mental health disorder places the child at risk of school absenteeism, with the greatest amount of school missed for children with major depressive disorder (average 14 days per year). On average, children with ADHD miss around 4 days per year of school

(AIHW, 2022). Additionally, average NAPLAN scores in the 2013-14 survey were lower for children with mental disorders (AIHW, 2022).

3.3   Speech and language

Children in middle childhood develop their language skills through watching others and by practicing their reading, talking and listening at home and at school with teachers and friends. Play provides the opportunity for children to practice their language skills, however parents who can take the time to read with their child, sing songs together, tell jokes, discuss the day and ask open ended questions, and chat while doing activities with their child can help to further develop their child's vocabulary and language skills (Raising Children Network, 2021h).

Speech.

At around 5-6 years old, a child's speech should be mostly clear and easy to understand however some immature sounds may still be evident; by 7-8 years old there should be no noticeable errors in speech sounds when talking and an unfamiliar person should understand almost everything the child says (Kid Sense Child Development Corporation, n.d. a; Raising Children Network, 2022b).

Language.

Raising Children Network (2021i) suggests a child at 5-6 years old will know many sounds that go with different letters of the alphabet and start to understand these sounds make up words. By 6 years old most children have started to read simple stories based on high frequency (e.g., and, the, that) and phonetic words (e.g., dog, cat, bin). Children this age can start to combine words to form active sentences (e.g., the cat chased the dog) and understand passive sentences (e.g., the dog was chased by the cat) (Raising Children Network, 2021i), however word tense and grammar can still be challenging (Raising Children Network, 2021h). The ability to form correct sentences will continue to improve over the next few years (Raising Children Network, 2021i). By 6 years old, most children can understand and follow three-step directions they are given (Raising Children Network, 2021i).

Children aged 6-7 years start to understand that single words can have different meanings depending on context (e.g., 'cool' as in cold and 'cool' as in awesome). They start to use longer words by joining two together (e.g., whiteboard) and understand that adding prefixes and suffixes to words can change the information (e.g., wrap and unwrap, teach and teacher) (Raising Children Network, 2021i).

At 8 years old many children will understand most of what they are reading and can read their grade-level texts on their own (Raising Children Network, 2021i). Children start to understand non-literal language, sarcasm and jokes that use language in an abstract way (Louw & Louw, 2020). They can express ideas, explain their thoughts and describe in detail what happened through the day (Raising Children Network, 2021h). Children at 8 years old will start to form compound sentences using words such as 'but' or 'because' to join sentences together. At this age, children start to get better at telling and writing stories by adding more details, using more

interesting vocabulary and making them longer with a logical sequence (Raising Children Network, 2021i).

Challenges.

Raising Children Network (2021i) suggest seeking professional help for language development if:

- At 6 years old a child is difficult to understand or does not speak in full sentences, has trouble following two step directions or has stopped using language they once had, or

- At 8 years old a child has a stutter or lisp when speaking, has difficulty following instructions or has stopped using a language skill they once had,

- If a parent/carer or teacher suspects a learning difficulty such as dyslexia or a disorder such as auditory processing disorder.

Children who have ongoing speech errors/difficulties may experience problems with socialisation due to their language delay. The speech errors may impact fluency and clarity of speech, result in trouble with spelling due to articulation errors, and impact expressive language development (Kid Sense Child Development Corporation, n.d. b).

Self-regulation and temperament can affect a child's conversation skills. Some children interrupt other people when they cannot control their own urge to speak, which can affect their social network. When children are 6-7 years old, children should know they can interrupt if something urgent or dangerous is happening but in other situations they should be taught to wait by being reminded about not interrupting, teaching them to say 'excuse me' and then waiting for their turn, and praising the child as they develop the ability to wait (Raising Children Network, 2020a).

Children may talk back or back chat after being given limits, instructions or consequences. Some strategies to manage these situations include: responding calmly and remind the child of family rules, give a consequence for the rudeness, and avoid laughing or giving a lot of attention that may encourage back chat in the future (Raising Children Network, 2020a).

3.4   Cognitive development

At around 7 years of age, children enter a new phase of cognitive development called the 'concrete operational stage' (Louw & Louw, 2020). This phase enables children to develop a better understanding of cause and effect so they can see how their actions affect other people and events (Raising Children Network, 2022a). Children are very inquisitive and ask a lot of questions, and at times might do small experiments to test how things work or 'what happens if'. The advancement in cognitive ability leads to problem solving and reasoning skills based on logic, however at this age children still have difficulty with hypotheticals and understanding abstract information (Louw & Louw, 2020).

Working/short term memory improves during middle childhood, helping children with learning tasks such as reading, understanding language, building vocabulary, and use of mental

imagery (Louw & Louw, 2020). Long term memory also improves at this age, meaning larger amounts of information can be recalled at a later date. Between 9-11 years old, children become more strategic and learn memory techniques from teachers and parents, leading to improved organisational skills as they use their own memory aids (Louw & Louw, 2020).

Other cognitive abilities, such as attention, processing speed and automatic processing, also improve through this developmental stage (Louw & Louw, 2020). However, because so much is happening in life at this age, it can be normal for children to get distracted and forget small requests and directions from others (Raising Children Network, 2022a).

Some of the common milestones children may reach in middle childhood are (Children's Health of Orange County (CHOC) Primary Care, 2021a; Healthline, 2019):

- 6-7 years old: understand the concept of numbers, know daytime from night-time, differentiate left and right, copy complex shapes such as a diamond, understand time, understand commands with three separate instructions, explain objects and their use, repeat three numbers backwards, read age-appropriate texts.

- 8-9 years old: can count backwards, know the date, decipher to read more words and read for enjoyment, understand fractions, understand the concept of space, draw and paint, name the days of the week and put into order, enjoy collecting objects.

- 10-12 years old: can write stories and letters, see events/opinions from different perspectives, can use common devices such as phones, tablets and gaming stations, maintain a longer attention span and sit for longer periods than when they were younger.

Pre-teens are building their independent decision-making skills. Parents can support their child in this process by discussing pros and cons of different options, discussing what can be done if things do not go to plan, and give advice and feedback when their child does make an independent decision (Raising Children Network, 2021j). Pre-teens with additional needs may take a bit longer to reach independence than other children, but parents can be guided by their child's professional care team about when and how to support the child to independently manage decisions (Raising Children Network, 2021j).

Challenges.

Poor working memory is associated with problematic classroom behaviour such as inattention and distractibility (Louw & Louw, 2020). Poor working memory can also impact a child's ability to complete tasks as they are unable to follow multiple verbal instructions given at once and invariably miss some steps (Tyler, 2020).

Learning disabilities often present in middle childhood as children start school and do not achieve the same level of academic performance as their peers. Learning disabilities are defined as a specific impairment of academic learning that interferes with a specific aspect of schoolwork that significantly reduces the student's performance in that domain (Tyler, 2020).

Common learning disabilities are dyslexia (reading), dysgraphia (writing) and dyscalculia (maths).

3.5 Physical health and mobility

Nutrition.

It is typical for a child's appetite to vary day to day. As a parent, it is important to support healthy eating habits by providing healthy food and the opportunity to eat it – it is then up to the child to decide how much they would like to eat (Raising Children Network, 2021k). Encouraging healthy eating habits starts in the home; strategies include (Raising Children Network, 2021k):

- Getting the child to help with meal planning and food preparation

- Eating healthy meals as a family

- Turning screens off during mealtimes

- Stocking the house with a variety of healthy foods

- Teaching them to pack a healthy lunchbox for themselves

Beginning to involve children in family cooking during middle childhood has the benefit of helping them to build maths skills and vocabulary, follow stepped instructions, and develop food preparation skills that will promote independence as they get older (Raising Children Network, 2019a). In middle childhood, children should have the ability to help with dishes, clean up the table, and prepare some foods such as peeling vegetables and mixing ingredients, but they may still need support and supervision around the sharp knives, the oven, hot-plates and hot liquids (Raising Children Network, 2019a).

Physical ability.

During middle childhood, children enjoy pushing themselves physically and developing more complex mobility skills, such as running in a zig-zag pattern, jumping downstairs and doing cartwheels (Raising Children Network, 2022a). Gross motor skills like kicking a ball and skipping are improving, however skill development depends on how often these activities are practised. Similarly, fine motor skills are more refined than the early years and children should be able to brush their teeth and tend to hygiene needs without help (Raising Children Network, 2022a).

Encouraging children to be physically active each day is important to improve cardiovascular health, boost immune system, develop strong muscles and bones, improve posture, maintain a healthy weight, and promote good mental health (Raising Children Network, 2022c). From the age of 5 years old, Australian guidelines recommend at least one hour of moderate to vigorous physical activity each day, and several hours of light physical activity each day; at least three times per week this should be activities that strengthen muscles and bones like running, jumping, climbing and lifting (Raising Children Network, 2022c). Physical activity is important

for children with additional needs, even if activities need to be modified to enable participation (Raising Children Network, 2022c). Providing an opportunity for children with additional needs to get outdoor physical activity will enable them to get vitamin D and also help build movement skills (Raising Children Network, 2022c).

Puberty and sexual development.

Puberty is considered early if it starts before 8 years in girls or 9 years in boys, and late if it has not commenced by 13 years in girls and 14 years in boys (Raising Children Network, 2021l). Many physical changes occur during puberty and parents can support this phase by openly talking about and explaining concerns around puberty and encouraging healthy eating, physical activity and healthy sleep routines (Raising Children Network, 2021m). Children with additional needs typically go through puberty the same as other children, however those with chronic health problems may cause a delay in the onset of puberty (Raising Children Network, 2021m).

Most sexual behaviour in middle childhood is typical and a healthy part of development. In middle childhood, this may involve wanting to touch their genitals, wanting privacy, kiss or hold hands with other children, or wanting to talk to others (including children) about sex (Raising Children Network, 2019b). Being open and honest about sex, bodies and relationships will help children to develop healthy sexual behaviours and relationships later (Raising Children Network, 2019b).

Sleep.

During middle childhood, children need 9-11 hours sleep per night (Raising Children Network, 2020b). Children who do not sleep well are often more susceptible to depression, anxiety and low self-esteem; inadequate sleep is also associated with overweight, possibly due to disrupted hormone function that regulates hunger (Louw & Louw, 2020). Good quality sleep improves cognitive function, helping the child to concentrate, remember things, and regulate their emotions and behaviour (Raising Children Network, 2020b). Parents can help their child get a good night sleep through implementing a bedtime routine (e.g., put pyjamas on, clean teeth, go to the toilet then bed at a set time), practice mindfulness before bed to relax, and consider turning off screens and dimming light an hour before bedtime (Raising Children Network, 2020b).

Challenges.

- Bedwetting – some children wet the bed after toilet training because they sleep very deeply, and other children may have bladder spasms overnight. Children who continue to wet the bed at 7-8 years old may benefit from assessment by their general practitioner (Raising Children Network, 2020b).

- Obstructive sleep apnoea – some children may occasionally stop breathing while asleep, evident as snoring, an audible pause, or a struggle to breath at night. The poor quality of sleep may cause the child to be tired the next day, impacting their functional

capacity (Raising Children Network, 2020b). Assessment by a general practitioner is recommended.

- Night terrors – night terrors are less common than nightmares, and often stop occurring by puberty. Nightmares are common for school age children and often wake the child up. As children get older they become more aware that it is just a dream (Raising Children Network, 2020b).

- Sleep walking – occurs when a child's mind is asleep but their body is awake. It usually doesn't need any treatment, and children often grow out of the behaviour during their adolescence (Raising Children Network, 2020b).

- Problematic sexual behaviour – some sexual behaviour isn't typical and might be a sign of something more serious that requires professional support. In school age children, this might include persistently rubbing or touching genitals in public, persistently flashing their genitals or bottoms to other children, persistently using coarse sexual or explicit language, wanting to play sexual games with much older or younger children, forcing or tricking other children into playing sexual games, and/or repeatedly wanting to look at or touch the genitals or other children or adults (Raising Children Network, 2020c).

3.6 Self-care

Self-care skills are activities of daily living that need to be undertaken to participate in life activities. In the early stage of middle childhood, many of these activities are typically supported by adults until the child develops the skill to successfully complete the activity on their own (Kid Sense Child Development, n.d. b). It is important to note, however, the age children can independently complete activities of daily living will depend on the learning opportunities they receive. For example, if an 8-year-old child wears shoes that use Velcro then they are not receiving the opportunity to practice and learn shoelace tying so it would be expected they would continue to need parental support if shoes with laces were worn.

Screening checklists obtained online through therapy clinic websites (Kid Sense Child Development, n.d. b; Skills for Life Paediatric Therapy, 2021) suggest that, given the learning opportunity, by the age of 8 years old many children can independently:

- Open lunch boxes, zip lock bags and food packaging

- Pack a bag for school or other outing with little prompting

- Self-regulate in busy or noisy environments

- Shower, wash hands and face

- Brush their hair and teeth

- Toilet themselves through the day and night

- Dress themselves, including tying shoelaces, doing up buttons and zips

- Help with some household chores such as making their bed, tidy their playroom

- Follow the classroom routine, such as putting their bag away and swap readers

- Tell the time and display some time management skills

- Feed themselves using utensils

- Prepare simple meals such as cereal or a sandwich

- Settle independently for sleep

The mid-to-late middle childhood stage is an important time for parents and caregivers to reinforce personal hygiene habits in preparation for adolescence and puberty (Raising Children Network, 2021n). Parents and caregivers can role model these habits and explain to their children the importance of maintaining good hygiene habits as they grow up. The Raising Children Network (2021n) highlight the following situations:

- Body odour – teaching children they need to change their underwear and clothes that sit next to the skin every day is important as these clothes collect sweat and body fluids that promote body odour. As puberty approaches, children develop a new type of sweat gland in their armpits and genital areas, so learning how to use antiperspirant deodorant can help stop body odour.

- Dental hygiene – parents and caregivers need to encourage children this age to brush their teeth at least twice a day, floss their teeth and take them to the dentist regularly.

- Periods – some girls will start getting periods through middle childhood. They will need parental support to learn how often to change their menstrual products and how they should dispose of it or clean it hygienically.

- Shaving – some children may want to start shaving through middle childhood. They will need parental support to learn how to safely use shaving products.

- Young people with additional needs will need extra time and support as they learn how to maintain good personal hygiene through middle childhood and into adolescence. To support learning and skill development, tasks can be broken down into smaller steps – such as shower, brush hair and clean teeth. A written routine schedule may make it easier for some children to learn what they need to do each day for their hygiene.

Learning how to maintain good personal hygiene is important for a child's health and confidence. Washing hands before eating and after the toilet can fight off germs and potential sickness. There is also a social benefit to maintaining good hygiene – if a child's body and breath smell okay and their clothes are clean, they will usually feel more comfortable around their peers and other people (Raising Children Network, 2021n). The earlier a parent or carer begins to have conversations around hygiene and encourages good habits the more likely these habits will be continued into adolescence (Raising Children Network, 2021n).

Fire safety.

A literature review completed in 2022 by the Technical Advisory Branch Tactical Research Team, titled 'Effectiveness of standard and specialised smoke alarms to wake children and adults', found that children aged 5-12 years old do not have a reliable waking response from deep sleep. Consequently, this age group have a higher reported fatality rate in residential fires than teenagers or adults as they are more likely to sleep through an alerting fire alarm (He & Nelson, 2007; Smith et al, 2022). It was also found that when children this age do awaken, they often become disorientated and afraid, and may hide which further increases the risk of perishing in the fire (Fire and Rescue New South Wales, 2017; Willoughby, 2009). Due to the unreliable waking response of children in this age-group, they are still reliant on parental and caregiver support to escape a house in the event of a fire (Willoughby, 2009).

Challenges.

Successfully learning and completing activities of daily living requires explicit skills training and structured practice, including gradually increasing the difficulty of tasks, provided in natural contexts such as the home and school environment. Caregiver and family involvement to both model skills and provide the opportunity for practice is essential in supporting children in the early and middle years to develop skill mastery to complete activities of daily living independently (Beisber and Cahill, 2021).

Professional advice is recommended if a child struggles with the self-care activities at 8 years old (Raising Children Network, 2022a):

- Dressing and undressing independently
- Daytime wetting or soiling
- Regular night-time wetting the bed

4. Adolescence to late teens (12-18 years)

4.1 Social-emotional ability and relationships

Social and emotional development.

Children between 12-14 years old are starting to show more interest in, and influenced by, their peer group, and express more concern about body image, their looks and the clothes they wear (CDC, 2021b). Adolescents respond well to social rewards during activities and prefer to be around others their age (Tyler, 2020). Nonetheless, at this age adolescents also display an increasing need for privacy (Healthline, 2019). It is common during this developmental stage for children to be very focused on themselves, and alternate between high and low confidence (CDC, 2021b).

The adolescent years can be a time of increased moodiness (Healthline, 2019). They may often feel strong emotions and can be overwhelmed by a sense of shame or humiliation, but

still might not have the skill to express and manage their emotions (Raising Children Network, 2021o). Some will feel stress and anxiety from the increasing challenge of schoolwork (CDC 2021b). This may lead to sadness or depression for some adolescents, increasing the risk of poor academic achievement and/or risky behaviours (CDC 2021b; CDC 2021c). Having friends who are high-achieving, motivated and engaged at school can promote the same feelings in the adolescent, whereas friends who are unmotivated, disengaged and low achieving can compound these feelings (Tyler, 2020).

As children mature through their teens they may struggle with their identity and question who they really are. This may lead to questioning about their appearance, vocational choice, education, relationships, sexuality, social views, personality and interests (Raising Children Network, 2021o; Tyler, 2020). As teens develop their self-concept, their self-esteem can also change.

Parents and carers can help their adolescent's social and emotional development through (CHOC, 2021b; Raising Children Network, 2021p):

- Encouraging them to try new challenges

- Talk with their adolescent about not losing themselves in their group relations

- Encourage positive friendships

- Talk about how behaviour can affect other people

- Encourage their adolescent to talk to a trusted adult about their problems or worries

- Discuss strategies to handle stress

- Provide consistent, positive discipline with reasonable boundaries

- Spend time together

Relationships.

As children enter adolescence, they may start to show less affection towards their parents and may sometimes seem rude or short-tempered (CDC, 2021b). Around 15-17 years old, many teens show more independence from their parents as they choose to spend time with friends (CDC, 2021c; Healthline, 2019). Conflict with parents may decrease in late adolescence, as the ability to have a deeper capacity to empathise with others develops (CDC, 2021c; Healthline, 2019).

More intimate relationships and more interest in romantic relationships and sexuality typically emerges through the middle to late teenage years (CDC, 2021c). Parents and carers can help adolescents build respectful relationships through conversations about how people behave in a respectful relationship, being a role model with their own relationships, giving praise for respectful behaviour and teaching or showing conflict management strategies (Raising Children Network, 2021q).

Challenges.

- Rule breaking – as teenagers try to increase their independence they may go through a stage of breaking family or school rules. Ignoring the rule breaking may help avoid conflict in the short term but may highlight to children that there is no point following rules. Calmly discussing the broken rule with positive discipline and consequences can reinforce expectations of behaviour (Raising Children Network, 2022d).

- Bullying – can be emotional or physical. During adolescence, cyberbullying becomes more common and can occur in text messages, emails, online games and social media platforms. Cyberbullying can lead to low self-esteems, disengagement from school, low academic achievement, and mental health issues such as depression, anxiety, stress and suicidal thoughts. Adolescents with a disability or mental health issue can make them more vulnerable to cyberbullying. Placing rules around technology use at home such as only 'friending' people they know, thinking before they post online, and limiting time on technology can reduce the chance of cyberbullying (Raising Children Network, 2022e).

4.2 Mental Health

Good mental health supports healthy development, strong relationships, and adaptability to change and challenges (Raising Children Network, 2021r). Adolescence is a risky time for mental health problems as teenagers go through many changes and challenges through this period.

Signs that may be a warning for mental health problems include (Raising Children Network, 2021r):

- Feelings of hopelessness, being tearful or lacking motivation

- Difficulty coping with everyday activities

- Sudden changes of behaviour for no apparent reason, including being aggressive or antisocial

- Changes to eating or sleeping patterns

- Suddenly doing less well at school or refusing to attend

- Avoiding friends or social contacts

- Regularly saying they have physical pain, such as headaches, stomach aches or backache

- Being aggressive or antisocial

- Being very anxious about their weight or physical appearance, including losing weight or trying not to gain as they grow.

Professionals that can help teens with mental health problems include the family general practitioner, counsellors, occupational therapists to manage daily living activities, and psychiatrists if the mental health concern significantly impacts the teen's life such as severe mood disturbance, debilitating anxiety or psychotic disorder (Raising Children Network, 2021s).

Body image.

Body image is how we think and feel about our body and relates to how happy and satisfied we are with how we look (Raising Children Network, 2019c). A good body image is associated with good self-esteem and mental health. Body image is influenced by factors such as family environment, ability or disability, peers, social media, and cultural background. Puberty also influences how adolescents view their body. Parents and carers can support their teen by focusing on them as a whole and praising their achievements, not discuss their physical changes unless the teen starts the conversation, point out unrealistic images on social media, and being a positive role model by avoiding fad diets, having a healthy lifestyle and not commenting on how others look (Raising Children Network, 2019c).

Mental health disorders.

The 2013-2014 National Youth Information Framework indicators, a survey of mental health for adolescents, reported that 14% of adolescents between 12-17 years old had a mental disorder in the 12 months prior to the survey; males had a higher prevalence (16%) than females (13%), although this was not a statistically significant difference (AIHW, 2015).

The most common disorders reported were anxiety disorder (e.g., social phobia, generalised anxiety disorder, obsessive compulsive disorder, and separation anxiety disorder), accounting for almost half of all the mental disorders in this age group (AIHW, 2015). This was followed by ADHD (6.3%) and major depressive disorder (5%). For 44% of 12–17-year-olds with a mental disorder, the impact of the mental disorder was considered mild, 33% had moderate impact and 23% experienced a severe impact (AIHW, 2015).

4.3   Speech and language

By adolescence, teens should be able to understand word meaning and contexts, punctuation and form complex sentences and texts (CHOC, 2021b). When queried, the explanations they provide may become more figurative than literal, and they have a greater capacity to understand abstract and figurative language such as similes, metaphors and idioms (CHOC, 2021b).

As children progress through adolescence to young adulthood their language skills become more complex, such as (Healthline, 2019):

- At 12-14 years old, teens can use speech that is not literal; they can use their tone of voice to communicate intentions, e.g., sarcasm

- At 15-17 years old, teens can speak, read, listen and write fluently and easily; have complex conversations; speak differently in different groups/to different audiences; write persuasively; understand proverbs, figurative language and analogies

4.4   Cognitive development

At around 12 years old, children enter what is called the formal operational stage of cognitive development. During the formal operational stage, adolescents start to understand abstract principles that have no physical reference, and contemplate abstract constructs as beauty, love, freedom, and morality (Tyler, 2020). During earlier periods of development children solve problems through trial and error, however adolescents begin to demonstrate hypothetical-deductive reasoning – developing hypotheses based on what might logically occur (Tyler, 2020).

Studies have found that executive functions (attention, increases in working memory, and cognitive flexibility) steadily improve from early childhood through to adolescence (Tyler, 2020). However, self-regulation, or the ability to control impulses, may still be immature in certain situations such as during high stress or high demand on mental functions (Tyler, 2020). The limbic system, the brain area that regulates emotion and reward, is linked to the hormonal changes that occur at puberty and is related to novelty seeking and a shift toward interacting with peers. In contrast, the prefrontal cortex, involved in the control of impulses, organization, planning, and making good decisions, does not fully develop until the mid-20s. The different rates of regional brain development can create a challenge for teens with respect to risky behaviour, poor decision making, and weak emotional control (Tyler, 2020).

Although the exact timing for cognitive maturity varies among children, it is expected the following characteristics are evident during the following age ranges (CDC, 2021b; CDC, 2021c; CHOC, 2021; Healthline, 2019):

- 12-14 years old:
    - develop own opinions different to their peers and parents
    - develops awareness that parents or carers are not always correct
    - have a better understanding of figurative language
    - greater ability for complex thought, logical thinking is improving but still maturing
    - better able to express feelings through talking
    - has developed a stronger sense of right and wrong
- 15-17 years old:
    - learn more defined study habits
    - show more concern around future school and work plans
    - sets long-term and short-term goals

- o better able to give reasons for their own choices, including about what is right or wrong

- o think more abstractly

- o shows greater concern for politics and social issues

4.5 Physical health

Nutrition.

During puberty, children are often hungrier because they go through a major growth spurt and require extra energy to support this growth (Raising Children Network, 2021t). It is common for teenagers to want to eat fewer healthy foods such as fruit and vegetables in preference for fatty and sweet junk foods. As teenagers get more independent with their food choices, parents and carers can encourage healthy nutrition by (Raising Children Network, 2021t):

- Being a healthy eating role model and showing how to make consistent healthy choices

- Eat regularly through the day to highlight the importance of eating regular meals

- Encourage the adolescent to help with family shopping and meal preparation

- Limit unhealthy options in the home

- Do not talk about restricting food or that some food is bad, explain balance

- Teach to eat when they are hungry and stop when they are full; recognise hunger cues

Physical activity.

Physical activity guidelines for teenagers recommend they get a minimum of 1 hour of moderate to strong physical activity each day (CDC, 2021c; CHOC, 2021b). Most of this time should be spent doing aerobic exercise, such as running, swimming or dancing. With supervision, teens can undertake sports that include strengthening exercises such as weights (CHOC, 2021b).

Puberty and sexual development.

The physical changes associated with puberty continue through the teenage years; the time for puberty to finish varies for each child but can be anywhere from 18 months to 5 years (Raising Children Network, 2021u). At around 11-14 years old, most children will have a growth spurt; girls tend to stop growing taller by 17 years old and boys 18-20 years old. Boys' voice will get deeper, girls will start to menstruate monthly, both sex's sexual organs will get bigger, and they will get pubic hair (Raising Children Network, 2021u). Parents and carers can help this phase of development through open communication, reassurance and support if their child expresses concern (Raising Children Network, 2021v).

Typically, through adolescence, teenagers develop their sexuality and sexual identity. They learn that sexual attraction and sexual identity are not the same, and that sexual attraction differs from gender identity (Raising Children Network, 2021w). Gender identity is the sense of

who they are – male, female, both or neither. A person is cisgender if they identify with the same sex they were given at birth, or gender diverse which includes (Raising Children Network, 2021x):

- Transgender – gender identity does not match the sex given at birth

- Non-binary – gender identity is neither male or female, or is a blend of male and female

- Gender fluid – person moves between gender identities

- Agender – does not identify with any gender.

Adolescents learn about sexuality from their parents, at school, with their friends, and online. Having open conversations at home can help teenagers navigate this sometimes-confusing period (Raising Children Network, 2021w).

Sleep.

Most teenagers need between 8-10 hours sleep to maintain physical health, energy levels, good mental health, cognitive performance and social relationships (CDC, 2021c; Raising Children Network, 2022f). During adolescence it is common for children to want to start to go to bed later at night and rise later in the morning as their circadian rhythm undergoes changes in the timing of melatonin secretion, making it hard for them to get to sleep early in the night (CHOC, 2021b; Raising Children Network, 2022f). As they progress to late adolescence, children can stay awake for longer as their brain matures.

To support teenagers to get the sleep they require (Raising Children Network, 2022f):

- Encourage them to keep a consistent sleep routine during the school week and weekends. Keeping wake-up time to within 2 hours of each other will help keep their body-clock regular.

- Make the hour before lights out to be screen free and do relaxing activities like read a book, have a warm shower or listen to music.

- In the bedroom, avoid the use of electronic devices and keep the room dimly lit.

- Eat healthy food during the day and do some physical activity.

- Talk or write about worries before going to bed so they do not ruminate.

- Use mindfulness or breathing exercises to calm the mind and body before sleep.

Challenges.

- Gender dysphoria – may develop during adolescence and is when they feel distressed that their gender identity differs from the sex assigned at birth. This distress may impact their psychological, social and academic functioning or manifest as self-harm (Raising Children Network, 2021x); gender dysphoria may be associated with bullying, stigma or discrimination from their gender identity.

- Acne – acne is common through puberty because of hormonal changes causing overactive sebaceous (oil-producing) glands leading to pimples on the skin (Tyler, 2020). Approximately 85% of adolescents develop acne, and boys develop acne more than girls because of greater levels of testosterone in their systems (Tyler, 2020). Acne can lead the adolescent to withdraw socially, especially if they are self-conscious about their skin or teased (Tyler, 2020).

- Unhealthy eating – habits such as eating too much, too little or restricting food groups can affect an adolescent's health and wellbeing (Raising Children Network, 2021t). Promoting healthy eating habits may reduce the risk of these issues.

- Eating disorders – the risk of anorexia, bulimia and avoidant restrictive food intake disorder is high during adolescence as they become aware of their body image and ideal self-identity (CDC, 2021b; Raising Children Network, 2021t). The family general practitioner or a dietician can provide advice with concerns about eating disorders.

4.6 Self-care

During adolescence, teenagers increase their self-care skills through making personal decisions like their food choices, exercise habits, sleep pattern, hygiene routine, and social behaviours. Teenagers can also contribute to tasks at home that build their independence, such as learning to cook, changing bed linen, washing clothes, and cleaning. Parents can help their teen develop self-care skills through modelling positive lifestyle choices and providing an opportunity for the teen build skills.

Healthy food choices.

Nutritious food is important for the growing teenager. Parents can encourage healthy food choices and support their teen to develop self-care skills by giving them the opportunity to try new recipes for the family and learning about how to budget the grocery money. While teens are still developing their food preparation skills in the kitchen they will need supervision around sharp knives, electrical appliances, hot stoves and ovens (Raising Children Network, 2019a).

Personal hygiene.

Personal hygiene through adolescence builds on the skills developed as pre-teens, for example regular showering, brushing hair and brushing teeth, and extends to tasks like period care, body odour, and shaving. Good personal hygiene is important for health and confidence. As outlined earlier in the Middle Childhood Section 3.6 – Self-care, particular hygiene concerns for pre-teens and teens include (Raising Children Network, 2021n):

- Body odour – during puberty new sweat glands become active in armpits and genital areas, so maintaining a regular shower routine, changing clothes daily and using antiperspirant deodorant will help reduce body odour.

- Dental hygiene – adolescents should brush their teeth at least twice a day, floss their teeth and visit the dentist regularly.

- Periods – when girls start to menstruate, they will need parental support to learn how to use and change their menstrual products to maintain good hygiene.

- Shaving – some adolescents will want to start shaving as they develop body hair; they will need parental support to learn how to safely use shaving products.

- Young people with additional needs will need extra time and support as they learn how to maintain good personal hygiene through middle childhood and into adolescence. To support learning and skill development, tasks can be broken down into smaller steps – such as shower, brush hair and clean teeth. A written routine schedule may make it easier for some children to learn what they need to do each day for their hygiene.

Screen time.

Teenagers use screens for their schoolwork, entertainment and socialising. As they spend a lot of time on screens, and often use more than one screen at a time, it is important that teenagers know how to make healthy choices about when and how to use screens in their free time (Raising Children Network, 2020d). Teenagers who are unable to find a balance between screen use and other activities are at risk of poor sleep, being sedentary, and experiencing online issues such as cyberbullying or encountering inappropriate content (Raising Children Network, 2020e).

Alcohol and other drugs.

Some teenagers may experiment with alcohol or other drugs, however it can also be a sign of serious problems and lead to substance abuse and poor mental health. There is no safe level of alcohol or drug use for children under 18 years old, and use of alcohol or other drugs may affect their development (Raising Children Network, 2021y). Signs that a teen may be using alcohol or other drugs might be mood swings, outbursts that are out of character, and big changes to clothes, friends and interests – although these can also be a typical part of exploring identity through adolescence (Raising Children Network, 2021y). If parents suspect alcohol or drug use, talking to their teen with calm and positive language is the first step to understand the problem. Support from the family general practitioner, counsellor and other health professionals is available for strategies and advice (Raising Children Network, 2021y).

4.7   Independence

The mid-teen years often see even greater independence of children from their parents as they move to young adulthood. This stage often involves teenagers exploring work experience for post-school options, getting a part-time job while finishing their schooling and getting their driving learners permit and eventually their full license. Parents and carers can support their teens in developing greater independence by allowing them to try new things, giving them more responsibility, and allowing them to make some decisions for themselves (Raising Children Network, 2021j).

- Driving permit - many teenagers are keen to get their learners permit for driving as it can give a sense of freedom and growing independence from parents (Tyler, 2020). The following table indicates the minimum age when teens can get their learner permit and provisional licence by Australian state:

State	Learner Permit	Provisional Licence
NSW	16y	17y
VIC	16y	18y
QLD	16y	17y
SA	16y	17y
TAS	16y	17y
WA	16y	17y
ACT	15y9m	17y
NT	16y	16y6m

- Volunteering – participating in community activities or volunteering can build skills and boost confidence; it can bolster the idea about civic responsibility and giving back to the community (Raising Children Network, 2021z). The following Raising Children Network provides a list of community activities and volunteer organisations and links for state-based volunteering websites: Community activity & volunteering: teens

- Casual and part time jobs – working part-time or casually while finishing school can give teenagers a greater sense of independence, learn how to manage time effectively, build skills for later employment and boost their self-confidence (Raising Children Network, 2021aa). Parents, carers and school counsellors can help teenagers prepare a resume and tips for interviews.

- Teen education, training and employment services – the following page on Raising Children Network provides a comprehensive list of links for teen education and employment through Australia: Teen education and employment links

- Post-school options – parents, carers and school counsellors can guide teenagers about their post-school pathway. Options include: higher education/university, TAFE, vocational education and training (VET), apprenticeships, work, or a gap year.

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Sensory-based therapy

The content of this document is OFFICIAL.

Research question: Is sensory integration, modulation, processing all talking about the same thing? Any other important terms to define?

Who might benefit from sensory support?

What is the evidence sensory support reduces the need for RRP?

What is the evidence for other more general outcomes?

Who might implement/qualifications for sensory support?

Date: 29/09/2022

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Review date:

1.   Contents

2. Summary

The terminology used in the literature on sensory disorder and sensory-based interventions (SBIs) is inconsistent. The terms sensory integration, sensory processing and sensory modulation are sometimes used interchangeably in the literature and sometimes given distinct definitions. General features of these key terms can be described.

Researchers and clinicians have employed SBIs for a variety of conditions. Most of the research available relates to interventions for Autism Spectrum Disorder (ASD) or other neurodevelopmental disorders such as intellectual disabilities or attention deficit/hyperactivity disorder, schizophrenia or other mental health conditions such a bipolar, depression or obsessive-compulsive disorder. There is also research relating to interventions for cerebral palsy, Huntington's disease and dementia.

There is some evidence that SBIs can contribute to a reduction in restrictive practice. The evidence is predominantly in the domain of mental health and is predominantly related to restrictive practice in a clinical or institutional setting. However, systematic reviews show inconsistent results. Based on the evidence collected it is not possible to say with confidence that SBIs reduce the use of restrictive practice. There are many factors which contribute to an institution's use of restrictive practice that are not addressed by the introduction of SBIs.

SBIs do likely have some positive effects. There is consistent evidence that SBIs reduce distress of people with mental health conditions and lower quality evidence that distress is reduced for people with Huntington's disease and dementia. There is low to moderate quality evidence of positive effect for young people with ASD relating to some core autistic characteristics, life outcomes and cognitive, motor and social-emotional skills. There is weak

evidence showing improvement in functional outcomes for children with intellectual disability and development delay.

SBIs are usually implemented by an occupational therapist. However, other professionals can be trained to implement SBIs including nurses, psychologists and speech therapists.

3.   Terminology

The literature on sensory therapies is not well organised and key terminology is not used consistently (Ouellet et al, 2021). However, rough definitions of the major concepts are possible.

3.1   Theoretical terminology

Underlying theoretical terms are often used in different ways. Brown et al (2019) provide an overview of the use of the terms **sensory integration**, **sensory processing, sensory modulation** and **sensory perception**, showing that despite considerable variation, these terms have also been used interchangeably in the literature. Based on their review, the authors propose the following definition of sensory modulation:

> Sensory modulation is considered a twofold process. It originates in the central nervous system as the neurological ability to regulate and process sensory stimuli; this subsequently offers the individual an opportunity to respond behaviourally to the stimulus (Brown et al, 2019, p.521).

They characterise sensory modulation as a combined neurophysiological and behavioural process within the larger category of sensory processing. Sensory processing also includes: receiving, organisation, perception, interpretation, registration and discrimination. They suggest sensory integration is the framework which encompasses the sensory processing sub-processes and the disorders associated with those subtypes (Brown et al, 2019).

However, we should also recognise that the process of proposing consistent definitions of these terms is largely revisionary considering the disagreement in the literature. For instance, sensory integration can refer to a neurological process, a theory or a practice depending on the researcher. Sensory processing might be used interchangeably with sensory integration (Camarat et al, 2020; Brown et al, 2019). Sensory processing is more often used in the literature related to autism, but sensory modulation is often used in the literature on mental health to refer to the same types of interventions (Brown et al, 2019; Hitch et al, 2020).

There is inconsistency in the definitions of sensory disorders as well. Diagnosis is made based on the presence of i) difficulties translating sensory information into appropriate behavioural responses and; ii) a demonstrable effect on activities of daily living (Ouellet, 2021). There is some controversy about whether sensory disorders are genuinely separate conditions or whether they are collections of symptoms associated with other conditions. The category of sensory disorders is not included in either the DSM-5 or the ICD-11 (American Psychiatric Association, 2013; World Health Organisation, 2019).

3.2   Types of sensory based interventions

Terms for therapeutic practices are also used in incompatible ways (Ouellet et al, 2021). In particular, there is an ambiguity in the use of the term **sensory based interventions**.

SBI can refer to a category of therapeutic techniques that include sensory integration therapy (SIT), auditory integration therapy (AIT), use of multi-sensory environments (MSE) and other techniques that target sensory processing difficulties. Preis and McKenna (2014) and Whitehouse et al (2020) use SBI in this way.

However, SBI can also refer to specific practices that are distinguished from SIT, AIT or MSE. Ouellet et al (2021), Basic et al (2021) and Wans Yunus et al (2015) draw the distinction between SIT and SBI based on the number of therapeutic modalities or stimuli. SBI is used to refer to techniques that use singular discrete stimuli to achieve the desired result (e.g., massage, a weighted vest). SIT on the other hand, uses multiple integrated stimuli and must include more than one sensory modality (Parham et al, 2007).

McGill and Breen (2019) note a further complication: SBI-type strategies are emerging in the context of positive behaviour support and multi-element behavioural interventions without being labelled as SBIs.

There does seem to be agreement that SBIs are based on the theoretical premise that sensory processing differences affect skill acquisition and behavioural development. By targeting sensory processing, the interventions aim to improve behavioural problems, emotional regulation, cognitive, language and social skills (Whitehouse et al, 2020).

Discrete SBIs, SIT, MSE and AIT are considered in further detail below. There are other therapeutic practices that can be included under the label SBI. Whitehouse et al also consider environmental enrichment, sensory diet and the following:

> alternative seating; blanket or "body sock"; brushing with a bristle or a feather; chewing on a rubber tube; developmental speech and language training through music; family-centered music therapy; joint compression or stretching; jumping or bouncing; music therapy; playing with a water and sand sensory table; playing with specially textured toys; Qigong Sensory Treatment (QST); Rhythm Intervention Sensorimotor Enrichment; sensory enrichment; swinging or rocking stimulation; Thai traditional massage; Tomatis Sound Therapy; and weighted vests (Whitehouse et al, 2020, p.70).

SBIs are usually implemented by occupational therapists, although speech therapists, nurses, psychologists and other professionals can be trained to implement programs (McGill & Breen, 2019).

3.2.1 Sensory-based interventions

SBI provides sensory stimuli that are specific or discrete to address behavioural problems causes by difficulties in sensory processing (Wan Yunus, 2015; Ouellet et al, 2021). The distinction between sensory-based and sensorimotor-based approaches is drawn differently in the literature. Ouellet et al (2021) says that sensory-based approaches involve a stimulus of

constant intensity, such as a weighted vest, whereas sensorimotor-based approaches include the use of movements, allowing the person to control the quantity and intensity of stimulation. In contrast, Wan Yunus et al (2015) distinguish between tactile (eg. massage, touch therapy, brushing), proprioceptive (eg. weighted vests) and vestibular (eg. therapy ball, cushions, horse riding) based interventions. Vestibular interventions involve patient movements and variation in the constancy of intensity of stimulus was not noted as a distinguishing feature of different techniques.

3.2.2 Sensory integration therapy

Sensory integration therapy (sometimes sensory processing therapy) is defined as any intervention that targets someone's "ability to integrate sensory information (visual, auditory, tactile, proprioceptive, and vestibular) from their body and environment in order to respond using organized and adaptive behaviour" (Steinbrenner et al, 2020, p.29). Steinbrenner et al (2020) regard SIT as synonymous with Ayers Sensory Integration (Ayers). Whereas Omairi et al (2022) treat Ayers as just one frequently used type of SIT.

Ayers can include equipment such as mats, swings, scooter boards and bolsters in "individually tailored sensorimotor activities that are contextualized in play at the just-right challenge to facilitate adaptive behaviours for participation in tasks and activities" (Omairi et al, 2022, p.4; Whitehouse et al, 2020). There are 10 core elements of Ayers:

- Provide sensory opportunities – intervention includes various sensory experiences (tactile, proprioceptive, vestibular) involving more than one sensory modality.

- Provide just-right challenges – sensory challenges are neither too difficult nor too easy for the individual

- Collaborate on activity choice – the participant is an active contributor to the intervention including choice of activity

- Guide self-organisation – participant is encouraged to initiate, plan and organise their own activities

- Support optimal arousal – the context should allow the child to maintain their optimal level of arousal

- Create play context – the context builds on the participants intrinsic motivation and enjoyment of activities

- Maximise child's success – activities are tailored so that the child can experience success

- Ensure physical safety – activities are tailored so that the child is safe and properly supervised

- Arrange room for engagement – the environment is organised to motivate the participant to participate in activities
- Foster therapeutic alliance – the participant is treated with respect and allowed to have their own emotional reactions to experiences (Parham et al, 2007; Wans Yunus et al, 2015; Whitehouse et al, 2020).

3.2.3 Multi-sensory environment

MSEs (also called comfort rooms, sensory rooms or Snoezelen rooms) are rooms that contain equipment used to modify the environment primarily with the aim to create sensory experiences. This includes equipment used to create lights, sounds, smells or proprioceptive and tactile sensations. The goal of an MSE is to soothe or stimulate a person with sensory needs (Unwin et al, 2022; Cameron et al, 2020).

Figure 1 Multi-sensory room

MSEs are often windowless or have covered walls. They commonly include:

(1) projection equipment to provide changing light colours and patterns, (2) sound (music) equipment, (3) bubble tubes offering visual, audible and tactile stimulation, (4) waterbed, (5) fibre optic lighting, (6) tactile objects, (7) user-controlled switching for changing lighting and other equipment, (8) weighted blankets, (9) self-massagers, (10) rocking chair(s), (11) exercise balls, and (12) squeeze balls (Cameron et al, 2020, p.631).

Rooms might also include essential oils, scented candles, sweet or salty foods (Cameron et al, 2020). Participants can control aspects of the environment thereby reducing the unpredictability or the environment and allowing the participant to regulate their own sensory stimulation (Unwin et al, 2022).

3.2.4 Auditory integration training

AIT aims to 're-educate' the auditory processing system of the patient's brain with 2 half hour electronic music listening sessions over 10 days. This re-education process is intended to target behaviour and learning problems in people with autism (Sinha et al, 2011).

Wans Yunus et al (2015) suggest auditory integration training (AIT) is a based on the same theory of sensory integration as SIT. However, because SIT involves multiple sensory modalities (Parham et al, 2007), AIT can only be considered a related therapy rather than a kind of SIT. Other related techniques include Tomatis sound therapy and Samonas sound therapy (Sinha et al, 2011).

3.2.5 Music therapy

Music therapy is considered a type of SBI by some (Whitehouse et al, 2020; Cheung et al, 2022) and not others (Steinbrenner et al, 2020). The mechanism by which music therapy is supposed to work does involve active listening and auditory sensory experiences, though it also includes social and cognitive processes (Geretsegger et al, 2014).

4.   Efficacy

Researchers and clinicians have suggested that sensory based interventions could benefit people with autism spectrum disorder, ADHD, developmental coordination disorder, cerebral palsy, down syndrome, intellectual disability, dementia, depression, schizophrenia, mood disorders, obsessive compulsive disorder (Wan Yunus et al, 2015; Sinha et al, 2011; Hitch et al, 2020; Ouellet et al, 2021).

4.1   Autism Spectrum Disorder

Steinbrenner et al (2020) and Whitehouse et al (2020) consider sensory-based interventions in their reviews of evidence-based treatments for young people with ASD.

Steinbrenner et al added Ayers to their 2020 review of evidence-based practices for children and young people with autism spectrum disorder. They note evidence of effect on communication, social skills, cognitive and academic outcomes, adaptive coping skills, challenging behaviour, and motor skills (Steinbrenner et al, 2020). However, Steinbrenner et al did not assess the evidence for efficacy in detail, but only show that Ayers meet their criteria for being considered an evidence-based practice:

> To be identified as evidence-based, a category of practice had to contain (a) two high quality group design studies conducted by two different research groups, or (b) five high quality single case design studies conducted by three different research groups and involving a total of 20 participants across studies, or (c) a combination of one high quality group design study and three high quality single case design studies with the combination being conducted by two independent research groups (Steinbrenner et al, 2020, p.24).

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Whitehouse et al (2020) considered 9 systematic reviews. No evidence was found of a positive effect for assorted SBIs, AIT or sensory diet. Environmental enrichment showed a positive effect on motor skills based on moderate quality evidence.

Ayers was considered in 4 reviews which showed low quality evidence of improvement to cognition, motor skills, challenging behaviours, academic skills and community participation. Reviewers also found moderate quality evidence of a benefit to motor skills. Low or moderate quality evidence showed inconsistent or null effect on autistic characteristics such as social-communication and sensory behaviours, communication skills, play, adaptive behaviour skills, and general outcomes. 1 review found evidence that SIT may contribute to increase in stereotypical and problem behaviours (Whitehouse et al, 2020).

Music therapy demonstrated the most consistent positive effect. Reviewers found moderate quality evidence showing positive effect on social-communication symptoms, communication skills, and quality of life. Reviewers found low quality evidence showing positive effect on play, motor skills, challenging behaviours, and school readiness (Whitehouse et al, 2020).

Interventions	No. of systematic reviews	Core autism characteristics				Related skills and development									Education and participation				Family wellbeing				
		Overall autistic characteristics	Social-communication	Restricted and repetitive interests and behaviours	Sensory behaviours	Communication	Expressive language	Receptive language	Cognition	Motor	Social-emotional/ challenging behaviour	Play	Adaptive behaviour	General outcomes[a]	School/learning readiness	Academic skills	Quality of life	Community participation	Caregiver communication and interaction strategies	Caregiver social emotional wellbeing	Caregiver satisfaction	Caregiver financial wellbeing	Child satisfaction
Systematic reviews of assorted sensory-based interventions*	3					o M								o LL									
Auditory integration Therapy	3					o M								o LL									
Ayers Sensory Integration (ASI)	4	? L	? LL		? LM	? LL			+ L	+ LM	+ L	o L	? LL	? M		+ L		+ L					
Environmental enrichment	1								o M	+ M													
Music therapy	4		+ M			+ M				+ L	+ L	+ L	? LL	? L	+ L		+ M			+ M			
Sensory diet	1													o L									

Sensory-based interventions

+ Positive therapeutic effect	? Inconsistent therapeutic effect	o Null effect	Blank cell indicates no evidence available	*Combines assorted interventions practices for this category. Please see page 79 for a full list.
L = Low quality	M = Moderate quality	H = High quality		

Figure 2 Summary of evidence for sensory-based interventions. From Whitehouse et al, 2020, p.75

Wan Yunus et al (2015) argue that there is sufficient evidence that tactile stimulation (such as massage therapy) positively affects challenging behaviours such that it can be included in clinical practice. This contrasts with both Whitehouse et al (2020) and Steinbrenner et al (2020) who note evidence that Ayers and music therapy can improve challenging behaviours, but who do not recognise evidence that discrete tactile stimulation can improve challenging behaviours.

4.2   Mental Health

Sensory profiles of people with mental health conditions differ from the norm. Brown et al (2020) found a general pattern of greater sensory sensitivity, sensation avoiding, and low registration and less sensation seeking in a group of patients with either schizophrenia, high risk for psychosis, bipolar disorder, major depressive disorder, posttraumatic stress and obsessive-compulsive. Machingura et al (2022) confirmed higher rates of low registration and sensory avoiding in a group of 41 people with schizophrenia.

SBIs are currently in use in mental health settings in Australia, including discrete SBIs and MSEs. While the evidence base is still emerging, existing studies consistently find an effect of SBIs on distress. Multiple systematic reviews over the past 10 years have concluded that SBIs are likely to contribute to a reduction in distress for patients with mental health issues in clinical settings (Scanlon & Novak, 2015; Hitch et al, 2020; McGreevy & Boland, 2020; Ma et al, 2021; Hain & Hallet, 2022). In a recent controlled trial, Machingura et al (2022) found a reduction in distress for patients with schizophrenia when comparing pre- and post-test scores. However, the effect was no longer statistically significant when compared with the control group.

SBIs are hypothesised to reduce the use of restrictive practice. State and national policies aiming to reduce the use of restrictive practice are driving adoption of and research into SBIs (Machingura et al, 2022; Baker et al, 2022; Baker et al, 2021; Hitch et al, 2020). The suggestion is that if SBIs can reduce distress and level of arousal, then fewer episodes requiring restrictive practice would occur. However, this assumption is questionable considering the effect of workplace culture and institutional/state policy on rates of restrictive practices (Scanlon & Novak, 2015). The evidence for an actual reduction in use of restrictive practice is mixed.

Scanlon and Novak (2015) reviewed 17 papers and found that of the 9 studies reporting only rates of restrictive practice use, all were using MSE type interventions. Of those studies 5 reported a reduction in rates of restraint or seclusion, 3 reported no change and 1 reported an increase.

Other systematic reviews also show inconsistent evidence that MSEs used in clinical or institutional settings can reduce restrictive practice. Haig and Hallett (2022) reviewed 6 studies which reported rates or seclusion, restraint or violence. 4 of the 6 reported any positive results: one out 6 studies found a reduction in seclusion episodes, 2 out of 6 found reductions in restraint and 1 out of 6 found a reduction in aggression. One study also found an increase in rates of seclusion. Haig and Hallett also note that all the studies reviewed had moderate to high risk of bias.

Oostermeijer et al (2021) completed a rapid review including 14 studies on the effect of MSEs on restrictive practices and found more positive results: 6 of the 14 studies found reduction in restraint; 10 of the 14 found reduction in seclusion; 3 of the 14 reported no statistically significant results; and 3 of the 14 reported an increase in restraint or seclusion.

None of the systematic reviews were able to complete a meta-analysis. The inconsistency of the evidence regarding MSEs effect on restrictive practice may relate to the unstructured and heterogeneous nature of the intervention. There may be effective MSE-based practices or protocols but existing studies have not identified them (Oostermeijer et al, 2021; Haig & Hallett, 2022).

Most research on SBIs for people with mental health conditions occurs in a clinical or institutional setting. Lack of research in community use of SBIs is a significant limitation of the existing research (Hitch et al, 2020).

Hitch et al (2020) argue that despite minimal evidence, there is at least sufficient evidence to support wider use in clinical settings due to minimal cost of implementation of many sensory based interventions (for example, the discrete SBIs described in 3.2.1 Sensory-based interventions).

4.3   Other conditions

There is some evidence that SBIs (especially MSEs, massage and music therapy) can contribute to reduction in distress and agitation for people with dementia (Livingston et al, 2014; Pinto et al, 2020; Cheung et al, 2022).

Fisher et al (2014; 2017) show minimal evidence that SBI can reduce aggression in people with Huntington's disease.

Kantor et al (2022) found positive effects of Ayers on motor skills of children with cerebral palsy. However, better quality evidence is required to draw reliable conclusions.

A 2015 meta-analysis found only weak evidence for the efficacy of SIT in improving functional outcomes for children with intellectual disability and development delay (Leong et al, 2015). Subsequent studies have shown that SIT can assist children with developmental delay when combined with a more comprehensive early intervention program (Wang et al, 2020).

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Child-centered play therapy for children with Autism Spectrum Disorder

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The Research Team are unable to ensure that the information listed below provides an accurate & up-to-date snapshot of these matters

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Research question: Is Child-Centered Play Therapy delivered by a Psychologist a more evidence based intervention than a multidisciplinary team approach for children over the age of 8 years old with a diagnosis of Autism Spectrum Disorder?

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1. Contents

2. Summary

Child-Centered Play Therapy (CCPT) is a type of psychotherapy or counselling used for children with emotional or behavioural issues. CCPT is a non-directive therapy in which the child leads the subject or content of the therapy sessions. Because goals for each session are not set prior to the session, it may be difficult to measure individual outcomes. Despite some quality issues with included studies, there is evidence that CCPT can benefit children with emotional or behavioural concerns. However, there is very limited research concerning children with autism. CCPT has not so far been included in reviews of evidence-based treatments for children with autism. Considering the lack of evidence, it is not possible to determine the comparative efficacy of CCPT and other treatments for children with autism.

3.   What is Child-Centered Play Therapy?

CCPT is a type of non-directive, developmental and relational psychotherapy for children. It is non-directive in the sense that the child determines what they do during the session (for example, what games or toys they play with) and what they talk about. It is relational in the sense that the therapeutic medium is thought to be the relationship between the child and the therapist. It is developmental in the sense that the child's behaviours are understood in the context of normal childhood development. This is a modification of Carl Rogers' adult-oriented non-directive or client-centred therapy. Rogers' program was first adapted for children by Virginia Axline in the 1940s (Jayne & Ray, 2015; Salter et al, 2016; Hillman, 2018; Ping & Jiar, 2019; Schottelkorb et al, 2020; Hillman, 2018).

Francis et al (2022) note that CCPT is designed to target social, emotional and behavioural development including attachment skills, emotional regulation, emotional recognition, self-control, self-regulation, and social competence. Systematic reviews often track effects of CCPT on problematic behaviours (internalising and externalising), child-parent relationship, stress, confidence and self-concept (Parker et al, 2021a Parker et al, 2021b; Lin & Bratton, 2015; Ray et al, 2015).

There are many kinds of therapy that utilise play and describe themselves as 'child-centred'. For example, Francis et al identify:

> Play Therapy, Theraplay, Play-based interventions, PRT, Joint Attention, Symbolic Play, Engagement & Regulation (JASPER, Advancing Social-communication And Play (ASAP), LEGO Therapy, The Developmental, Individual Difference, Relationship-Based (DIR) Floortime Model, The Paediatric Autism, Communication Therapy (PACT), Stay, Play, & Talk, PLAY Project, Project ImPACT, Early Start Denver Model (ESDM), E-PLAYS, CCPT (Child-centred play therapy), Filial therapy, Animal/Parent/Peer/Sibling assisted play (Francis et al, 2022, pp.6-8).

Therapies which are child-centred and employ a play-based approach might be used by different allied health practitioners including occupational therapists and speech therapists. However, the term 'Child-Centered Play Therapy' is a name for a specific kind of

psychotherapy or counselling. To indicate this, I have capitalised the term and retained the American English spelling.

4.   Efficacy of Child-Centered Play Therapy

CCPT has built up an evidence-base showing positive outcomes for children with a variety of behavioural and emotional concerns (Cochran et al, 2022). Despite the existing evidence, some clinicians and researchers exclude CCPT from evidence-based approaches to childhood mental health due to the quality of the studies in question (Parker et al, 2021b; Lin & Bratton, 2015).

Two 2015 meta-analyses found evidence of small-medium effect sizes for improvements in certain outcomes. Lin and Bratton (2015) found moderate effects of CCPT on global behaviour problems, internalizing behaviour problems, externalizing behaviour problems, academic performance and moderate to large effect sizes on caregiver–child relationship stress and self-efficacy. Ray et al (2015) looked at CCPT in schools and found small to medium effect sizes for improvement in academic outcomes, reduction in externalising behaviours and total problematic behaviours and small effect sizes for internalising behaviours and self-efficacy.

These results are supported by a 2021 meta-analysis looking at CCPT for problematic behaviour. Parker et al (2021b) showed small to medium effect size for reduction in externalising behaviour, medium effect size for reduction in overall problematic behaviour and small effect size for reduction in aggressive behaviour. In contrast, Kuhn et al (2022) reviewed child-focused interventions used to treat externalising behaviour and found most studies did not report a positive effect. However, the authors grouped together seven studies covering play therapy, non-directive or child-centred therapy and included only one study from 2002 identifying use of CCPT.

Two systematic reviews explored CCPT in a trauma context. Humble et al (2019) reviewed only seven studies of CCPT for young people with a history of trauma and found considerable variation in results and measures. The authors do note some consistency in significant outcomes for internalising problems, self-concept, and self-competence. Parker et al (2021a) reviewed 32 studies and found the proportion of studies showing significant results varied with outcome:

- externalising behaviour – 9 of 15 studies reported significant results
- internalising behaviour – 4 of 11 studies reported significant results
- total problem behaviours – 9 of 13 studies reported significant results
- parental empathy – all of 8 studies reported significant results
- total stress – 4 of 10 studies reported significant results
- parent stress – 4 of 8 studies reported significant results
- child stress – 3 of 6 studies reported significant results.

The authors did not report on effect sizes of reviewed studies. The authors note the need for increased rigour and consistency in studies including intervention in more realistic settings, larger sample sizes, use of consistent outcome measures, longer study timeframes and better statistical analyses.

5.   Child-Centered Play Therapy for children with autism

While Francis et al (2022) note that CCPT is not designed for people with autism, CCPT researchers and practitioners suggest the therapy may be well-suited for use with children with autism. CCPT intends to create an environment in which the child feels safe, understood and feels they are able to express themselves in whatever way they prefer. This environment is thought to create the conditions for greater receptiveness to the effect of the therapeutic relationship and greater opportunity to practice self-regulation skills. Researchers contrast this with behavioural approaches, which they say set up an expectation that the child's behaviour is a problem and needs to be fixed (Schottelkorb et al, 2020). In addition, CCPT may affect some areas typically targeted in treatment for children with autism such as anxiety, difficulty with joint attention, imitation response, theory of mind and symbolic and functional play skills (Schottelkorb et al, 2020; Hillman, 2018). Hillman suggests:

> Within the CCPT framework, joint attention is explored as the child shares his or her interest areas with the therapist. These circumstances create a safe platform where the child can be free from inhibitions. Over time, as the child feels more secure, this platform typically broadens, allowing the child to engage in a wider range of activities and increased interactions with the therapist. The repertoire of social behaviors emerging in the therapy room can then be generalized to other supportive environments, such as the home (Hillman, 2018, p.79).

Despite its wide-spread use, there is only a small literature examining the use of CCPT for children with autism. Schottelkorb et al (2020) identify only two studies. Salter et al (2016) identify four studies, all single case studies. A systematic review of play-based interventions for young people with autism (Francis et al, 2022), found only one paper using CCPT that met their inclusion criteria. Based on a database search and bibliographical search of existing studies, there appear to be a total of seven primary studies considering the effectiveness of CCPT for children with autism and one systematic review specifically focussed on CCPT for children with autism. Of the seven primary studies, four were case studies, two were multiple participant single case design studies and one was a randomly controlled trial. Of the two single case design studies, one included three participants (Salter et al, 2016) and the other included five participants (Ware Balch et al, 2015). The RCT included 23 participants (Schottelkorb et al, 2020). The total number of subjects considered in the evidence base is 35.

Hillman et al (2018) found some support for the use of CCPT for children with autism, specifically around reducing problematic behaviours, however the evidence is not strong. The review only included a combined total of 10 participants. Treatment duration was around 10 weeks for each of the studies, session duration varied from 30 to 60 minutes and frequency varied from weekly to twice weekly. The participants of all four studies were also undertaking

other therapies, including applied behaviour analysis, speech therapy and social skills training. It is therefore difficult to separate the effect of CCPT from other therapies.

The strongest evidence is from Schottelkorb et al (2020). This RCT was published in 2020 but submitted for publication in 2018 and so did not consider the findings of Hillman et al (2018) in their discussion. Schottelkorb et al investigated the effect of intensive CCPT (four 30-minute sessions per week for 12 weeks) on core autism symptoms and externalising behaviours. They compared the treatment group to a waitlist control and therefore no comparison of therapeutic approaches is possible. Of the 23 participants, 11 were receiving speech therapy at the time of intervention and 16 were receiving occupational therapy. The authors found improvement in social responsiveness and reduction in externalising behaviours. However, limitations include small sample size, lack of follow up and reliance on only parent reported outcomes. In addition, due to the intensity of the therapy, the results may not say much about less intensive therapy.

While there are theoretical and experimental reasons suggesting CCPT is potentially effective for children with autism, this is based on minimal evidence and is likely to be revised with further published research. The status of CCPT is not assessed by either Steinbrenner et al (2020) or Whitehouse et al (2020), two systematic reviews of evidence-based treatments for children with autism.

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